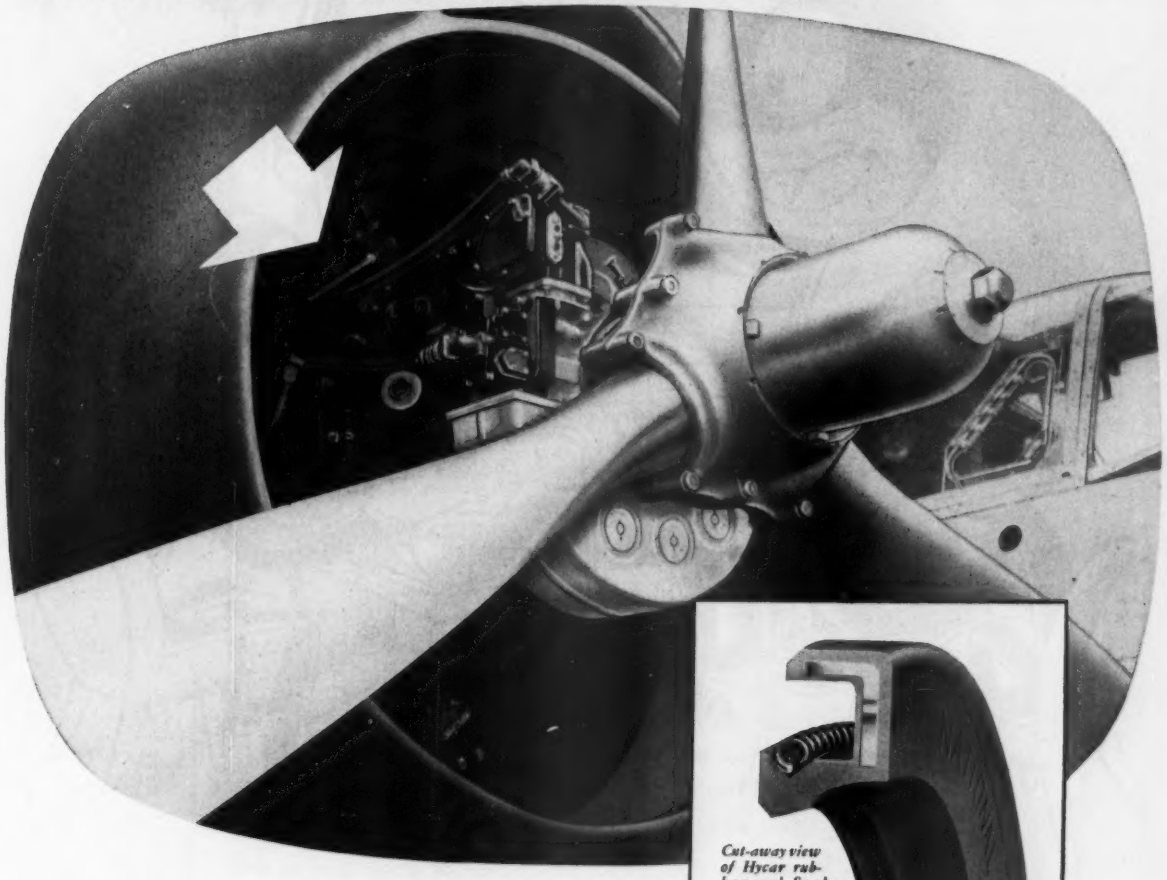
Another new development using

B. F. Goodrich Chemical *raw materials*



Cut-away view of Hycar rubber seal. Seal has 6½" i.d., molded onto metal base, is spring-tensioned, precision-trimmed.

NO OIL LEAKS HERE

—because of HYCAR!

Oil seals designed and manufactured by National Motor Bearing Co., Inc., Redwood City, Calif., for Hamilton Standard Division, Windsor Locks, Conn. B.F.Goodrich Chemical Co. supplies the Hycar rubber only.

PREVENTING leakage from propeller oil control assemblies is a vital job—calls for a seal with unique advantages. The seal must be positive, must resist the deteriorating effects of oil, extreme temperatures and high surface speeds.

It was only natural that the seal manufacturer chose Hycar nitrile rubber—for Hycar meets these rigid requirements.

The Hycar rubber seals are precision-molded and compact in design because of critical space limitations. They operate in temperatures ranging from −65°F. to 220°F. And they withstand the severe abrasion conditions resulting from surface speeds of 3,250 f.p.m.

These Hycar rubber seals are suitable for use with AN-O-8 Grade 1100 and AN-O-9 Grade 1010 fluids, and MIL-O-5606 oil.

Perhaps one of the many Hycar rubber compounds can solve a problem for you—can help you improve or develop a sales-making product. For Hycar resists oil, gas, heat and cold, aging, abrasion and many chemicals. For helpful technical information, please write Dept. HB-1, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

B. F. Goodrich Chemical Company
A Division of The B. F. Goodrich Company

Hycar
American Rubber

GEON polyvinyl materials • HYCAR American rubber • GOOD-RITE chemicals and plasticizers • HARMON organic colors

Each **Philblack*** *has a job to do! They will improve your product, too!*

What are your needs! Abrasion resistance? Easy processing? Flex life? Accurate moldings? Electrical conductivity? There's a Philblack to fulfill every requirement.

Use Philblack E when you want *super* abrasion resistance. This SAF black adds as much as 42% longer life to cold rubber tire treads. Super resistance to cut and crack growth, too!

Use Philblack O for excellent abrasion resistance, long flex life and good electrical conductivity. This HAF black is used extensively in tires, industrial belts and hoses.

Use Philblack A to ease processing troubles, assure accurate moldings and smooth, fast tubing—a black to improve appearances of finished products.

For full information, consult our technical sales representative who calls on you or write our nearest office.

PHILLIPS CHEMICAL COMPANY

PHILBLACK SALES DIVISION

EVANS BUILDING • AKRON 8, OHIO

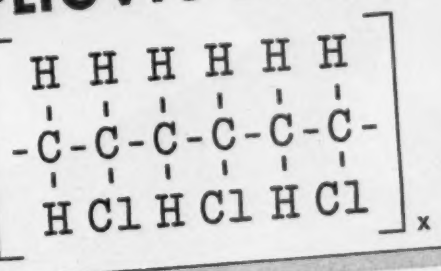
PHILBLACK EXPORT SALES DIVISION • 80 BROADWAY • NEW YORK 5, N. Y.

* A Trademark

Philblack E, Philblack O and Philblack A are manufactured in Borger, Texas. Warehouses in Akron, Boston, Chicago and Trenton. West Coast agent: Harwick Standard Chemical Company, Los Angeles. Canadian agent: H. L. Blachford, Ltd., Montreal and Toronto.

For rapid, low-temperature processing

Use this great NEW polyvinyl chloride resin PLIOVIC G80V



PRODUCTION TRIAL #156

Pliovic G80V: Goodyear Resin

The resin, stabilizer and lubricant were placed in the blender, the blades started rotating, hot plasticiser was poured in across the batch, and the lid of the blender lowered. The batch was completely blended for mill mixing in less than a minute and it flowed out through the opening at the top with no difficulty whatsoever. The batch was satisfactorily blended even after this very short cycle.

Two mills were used for banding the compound, and one mill was used to finish the fluxing and stripping off. It was all the two breakdown mills could do to keep up with the stripping mill, and the granulator could not keep up with production due to the fact that the resin fluxed and milled so rapidly. This is the fastest processing resin we have ever seen.

• Now available in commercial quantities, PLIOVIC G80V is the second in a series of new Goodyear polyvinyl chloride resins. Introduced primarily for use where low temperatures (20-40° F. lower than PLIOVIC G90V) and rapid processing are required, its success has been proved by customer use across the country — with results like those shown in the production report.

You can secure samples and full details for evaluation in your own plant on both PLIOVIC G90V and the *new* G80V by writing:

Goodyear, Chemical Division, Dept. 3-B, Akron 16, Ohio

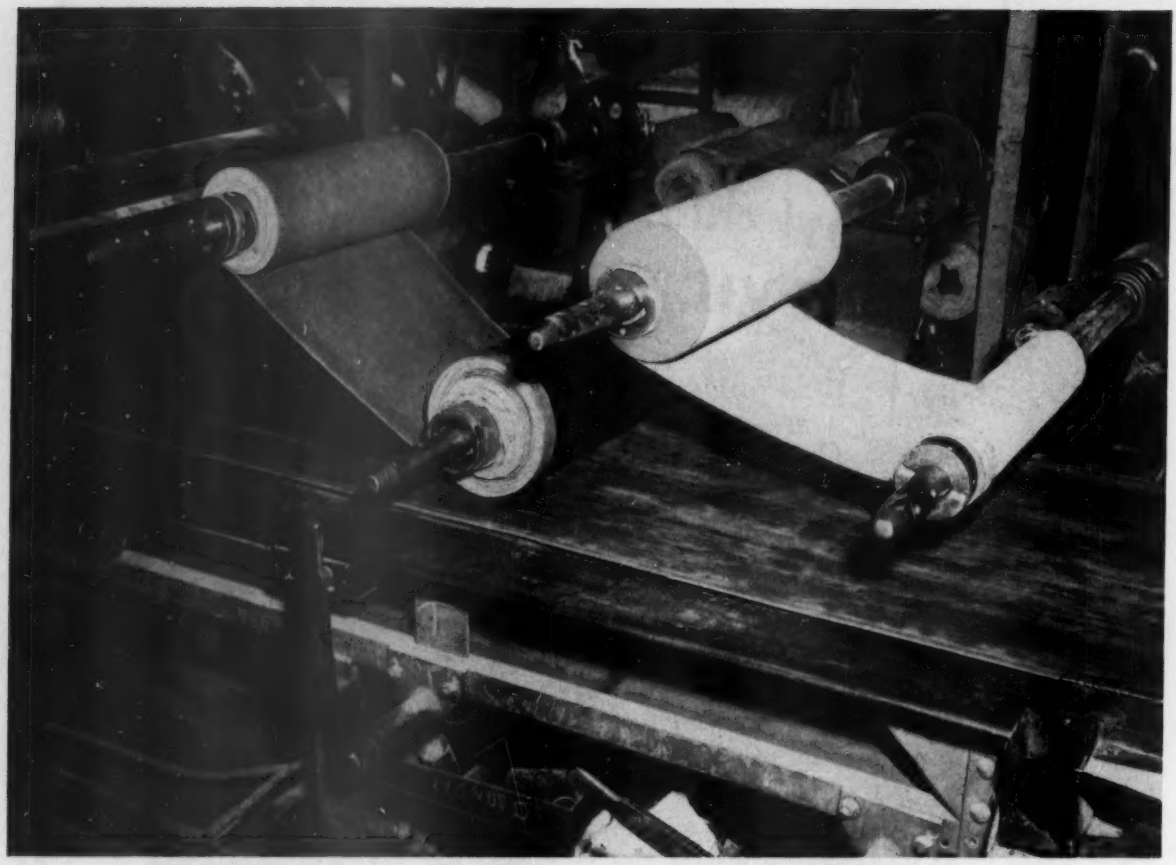
CHEMICAL GOODYEAR DIVISION

We think you'll like "THE GREATEST STORY EVER TOLD"— every Sunday—ABC Radio Network

THE GOODYEAR TELEVISION PLAYHOUSE— every other Sunday—NBC TV Network

Chemigum, Pliobond, Pliolite, Pliovic—T.M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

Use-Proved Products — CHEMIGUM • PLIOBOND • PLIOLITE • PLIOVIC • WING-CHEMICALS — The Finest Chemicals for Industry



CLIMCO PROCESSING—
To Prevent Sticking

At the bias cutter, cut bands will not stick if they are rolled into liners.

Besides preventing adhesions, Climco Processed Liners help all along the line to eliminate tie-ups that cost production time and money. Lint and ravelings, air, moisture, sunlight are excluded—oxidation, mold and bloom are prevented. Tackiness is preserved.

Labor and power are saved, stock losses are reduced and accurate gauges are maintained more easily. Latitude in compounding is enlarged.

For over 31 years, Climco Processed Liners have been used to protect stocks and take the "kinks" out of production lines. Give Climco Processed Liners a trial in your plant.

THE CLEVELAND LINER & MFG. CO.
5508 Maurice Ave. • Cleveland 27, Ohio

GET THE FULL STORY ON CLIMCO PROCESSING

Illustrated booklet tells about Climco Liners and Linerette separating paper. Tells how to get better service from liners. Write for your copy now.

LINERETTE INTERLEAVING PAPER
Treatment Contains **NO OIL OR WAX**
Samples on Request

CLIMCO
PROCESSED LINERS
FOR FASTER, BETTER PRODUCTION AT LOWER COST

Sole makers —

Here's why you should use PLIOLITE S-6B

—in light soles

because normal processing temperatures don't darken this resin like they do most competitive rubber reinforcing resins

because pigments disperse thoroughly with a minimum of streaking and splotching

because you get adequate hardness without excessive loading and difficult mixing

You can prove these statements yourself. Write for a demonstration of heat stability of PLIOLITE S-6B

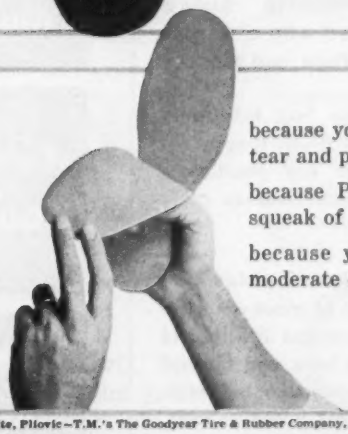
—in black soles

because of excellent abrasion resistance even at high loading with Fine Thermal Blacks

because good firmness is achieved with all types of Carbon Blacks

because quality is improved while costs are kept low

Try PLIOLITE S-6B in shoe soles to meet military specifications such as MIL-S-10047 and MIL-S-1762



—in inner soles

because you can raise your standards for hardness, tear and permanent set

because PLIOLITE S-6B eliminates crack, curl and squeak of many competitive types of inner sole

because you can gain uniform high quality at moderate cost

Chemigum, Pliobond, Pliolite, Pliovic—T.M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

Wherever rubber needs reinforcement, it will pay you to try PLIOLITE S-6B. Write for details to:
Goodyear, Chemical Division, Akron 16, Ohio

CHEMICAL
GOODYEAR
DIVISION

We think you'll like "THE GREATEST STORY EVER TOLD"—every Sunday—ABC Radio Network
THE GOODYEAR TELEVISION PLAYHOUSE—every other Sunday—NBC TV Network

Use-Proved Products—CHEMIGUM • PLIOBOND • PLIOLITE • PLIOVIC • WING-CHEMICALS—The Finest Chemicals for Industry

Bags treated with DOW CORNING Silicone Lubricants make better tires

Moe Muscles knows how easy it is to handle bags properly treated with Dow Corning Emulsions. They slip smoothly into place and they come out without sticking. Same's true when he gets green carcasses treated with a solvent solution of Dow Corning Mold Release Fluid and talc.

And Inspector Mike loves those silicone bag lubricants too, because of the glossy black interior finish they give. Separated cords and loose tuck-unders are practically eliminated. Bags handle easier and maintenance costs are reduced substantially.

Silicone treated bags, like silicone lubricated molds stay in service longer. You get easier release of more accurate and highly finished tires free from blemishes inside and out. That's why most rubber companies here and abroad specify Dow Corning silicone mold release agents; emulsions for curing bags and molds; fluid for green carcass, bead and parting line release.

DOW CORNING SILICONES MEAN BUSINESS!

For more information call our nearest branch office or write for Data Sheet CM-1

DOW CORNING CORPORATION

ATLANTA • CHICAGO • CLEVELAND • DALLAS • LOS ANGELES

In Canada: Fiberglas Canada, Ltd., Toronto

DOW CORNING SILICONES

MIDLAND, MICHIGAN

NEW YORK • WASHINGTON, D. C.

In Great Britain: Midland Silicones Ltd., London

RUBBER FABRICATORS NEED ACCURATE CUTTING DIES

For Cutting

Rubber, Neoprene, Plastics, etc.
Sheeting, Foam, Sponge, Cellular,
Cured & Uncured

Gang Dies Our Specialty

- Accuracy to close Tolerances
- Durability
- Genuine Understanding of the problems of rubber goods manufacturers

MALLET HANDLE DIES

PURPOSE — For those who have no machinery and do not wish to purchase any. For Cutting — Rubber, Neoprene, Plastics, etc.

ADVANTAGE — Cut direct from bolts or not.

SERVICE—One to three days.

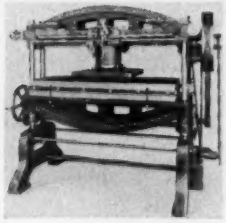
STEEL RULE CUTTING DIES

Used on Die Cutting Press, Printing Press or Power Press

PURPOSE — Especially suited for cutting — Rubber, Neoprene, Plastics, etc.

ADVANTAGE—Low in cost. Suitable for long production runs. It is necessary to cut from rectangular sheets which are fed into the press.

SERVICE—One day service.



STEEL RULE CLICKER DIES

Use On Clicker Machine or Dinker Press

PURPOSE—For Cutting Rubber, Neoprene, Plastics, etc.

ADVANTAGE — More reasonably priced than the all steel dies. Recommended for small and medium quantities where cost of an all steel die is not warranted.

SERVICE—One day service.

ALL STEEL DIES

Use On Clicker Machine or Beam Press or Power Press

PURPOSE—For Cutting—Rubber, Neoprene, Plastics, etc.

ADVANTAGE — Cut direct from rolls without first cutting into sheets.

SERVICE—One to three day service on dies.

DIE CUTTING SERVICE

PURPOSE—For those who prefer to have their cutting done by others.

ADVANTAGE—We can die cut your product for you on our own presses rapidly and economically at a low "per thousand" cost.

SERVICE—One to three days.

Dies for cutting
Gaskets, flashing from molded parts, rubber soles, foam and sponge for furniture padding, inflated toys, clothing and footwear, etc.

SAME DAY SERVICE

ACCURATE

STEEL RULE DIE MANUFACTURERS

24-28 West 21st Street, New York 10, N. Y. CHelsea 2-0860-1

Subsidiaries: American Fabricators; Interstate Die Cutting Co., Inc.

Intelligent Service to the Rubber Goods Industry for Over 22 Years

When you think of THE Z-TYPE CALENDER you are thinking of FARREL-BIRMINGHAM®

Originated and developed by Farrel-Birmingham engineers, the Z-type calender has established new standards for accuracy in calendering both rubber and plastics. It has proved to be equally outstanding for the high-speed production of film and sheet, and for single and double coating.

The company has also specialized in engineering complete calender trains, incorporating an embosser, cooling train and windup. Other units, such as Banbury mixers and mills, matched in capacity with the calender train, can also be supplied to make production a single integrated operation.

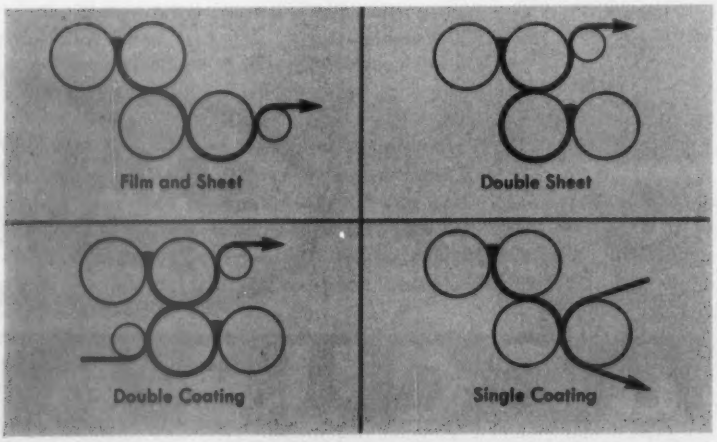
Farrel-Birmingham engineers will be glad to discuss your calendering problems with you.

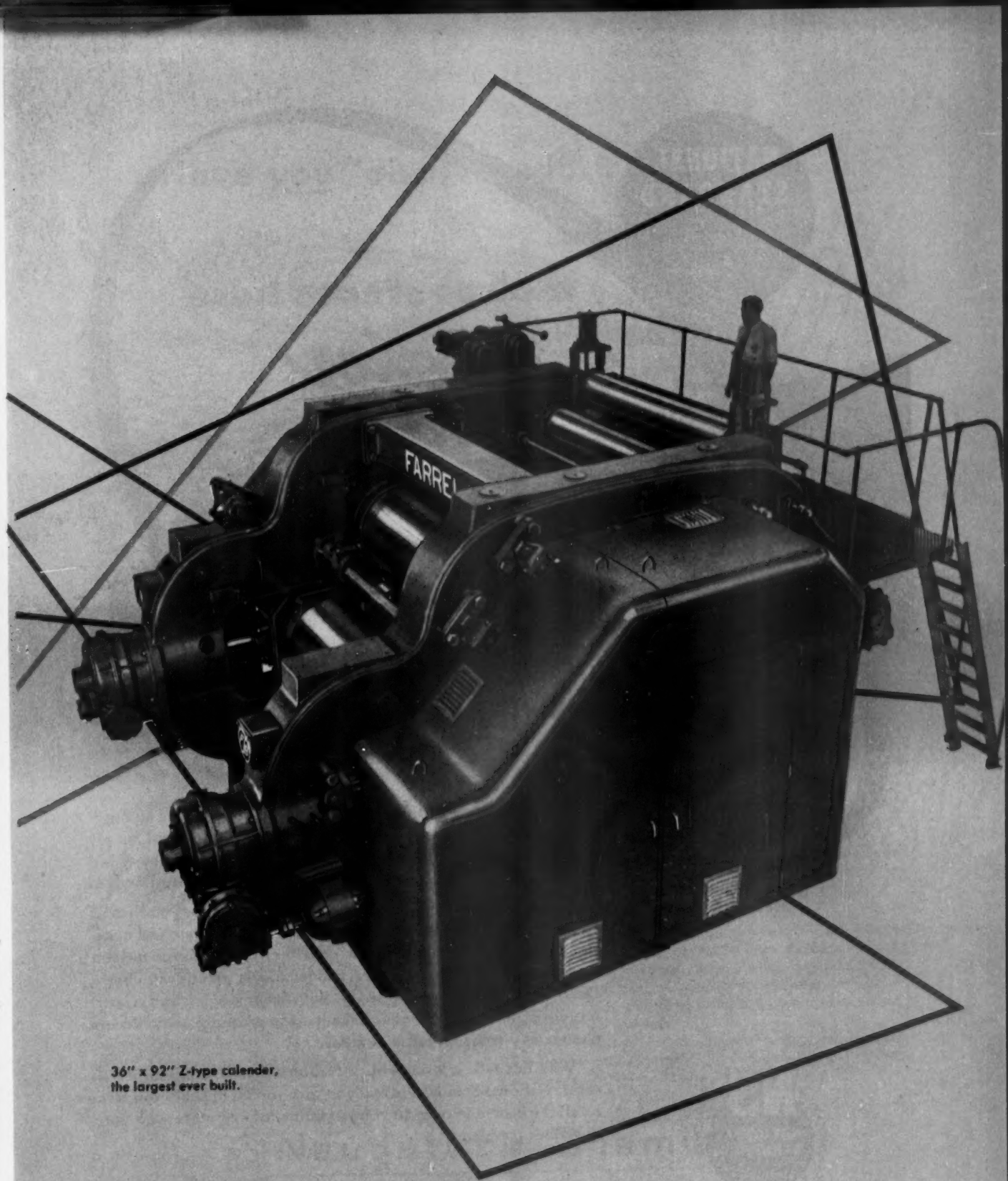
When you think of the Z-type calender, you are thinking of Farrel-Birmingham.

FARREL-BIRMINGHAM COMPANY, INC. • ANSONIA, CONN.

Plants: Ansonia and Derby, Conn., Buffalo, N. Y.

Sales Offices: Ansonia, Buffalo, New York, Akron, Chicago, Los Angeles, Houston





36" x 92" Z-type calender,
the largest ever built.

Farrel-Birmingham®

FB-796

NATIONAL-STANDARD *braided wire braid*

makes steam hose *tougher*

simplifies production

HERE'S a suggestion that might help you improve the strength and life of your hose, while reducing production costs! Simply weigh carefully *all* the advantages you stand to gain by using National-Standard flat braided wire braid in your hose construction.

For example, flat braided wire braid eliminates the problem of single wire breaks and uneven loops. You save the time and material normally lost in attempting to equalize wire length and tension for uniform stress distribution. Production is greatly simplified. Quality can be better controlled . . . with fewer seconds and rejects. Moreover, unequaled mechanical adhesion prolongs hose life and eliminates a frequent cause of failure.

Why not talk it over with a National-Standard engineer? As usual, National-Standard is ready to give you all the help you want . . . all the benefit of over 40 years of intimate experience with wire-in-rubber problems.

NS NATIONAL-STANDARD Company NILES, MICHIGAN

DIVISIONS OF NATIONAL-STANDARD CO.

ATHENIA STEEL	*Clifton, N. J.*	Flat, High Carbon, Cold Rolled Spring Steel
NATIONAL-STANDARD	*Niles, Mich.*	Tire Wire, Stainless, Fabricated Braids and Tape
REYNOLDS WIRE	*Dixon, Illinois*	Industrial Wire Cloth
WAGNER LITHO MACHINERY	*Jersey City, N. J.*	Metal Decorating Equipment
WORCESTER WIRE WORKS	*Worcester, Mass.*	Round and Shaped Steel Wire, Small Sizes

Have you "discovered"....

Paracril®?

You're missing a bet if you're not one of the thousands who *have* "discovered" and are profiting from this amazing oil-resistant rubber!

You'll find, as manufacturers everywhere have, that this unusual butadiene-acrylonitrile copolymer offers a far superior combination of properties—for superior rubber products.

Naugatuck Chemical's Paracril provides—

- **outstanding oil resistance**
- **excellent processing characteristics**
- **remarkable resistance to normal and high-temperature aging**
- **extreme low-temperature flexibility**
- **high abrasion resistance and good set**

Uses? Practically wherever rubber has been used—and in many applications unsuited to natural or other synthetic rubbers. Available in crumb or bale form, Paracril may be used for extrusions, calendering, molding, or cements—may be blended with vinyl resins, phenolics, or other rubbers to add unique new performance features.

Why not discover Paracril's many advantages for yourself? For free samples of specific types of Paracril, or free data thereon, write to address below.

Naugatuck Chemical

Division of United States Rubber Company

101 ELM ST., NAUGATUCK, CONNECTICUT

IN CANADA: NAUGATUCK CHEMICALS DIVISION • Dominion Rubber Company, Limited, Elmira, Ontario

Rubber Chemicals • Aromatics • Synthetic Rubber • Plastics • Agricultural Chemicals • Reclaimed Rubber • Latices

ANNOUNCING
OUR NEW ADDRESS...

WITCO CHEMICAL COMPANY

260 MADISON AVENUE

NEW YORK 16, N.Y.

To secure more space, to take advantage of the latest developments in modern office building design and to provide even better service, Witco's home offices are now located in this new office building. Next time you're in the neighborhood, stop in. We'll be glad to show you our new home.

WITCO

LOS ANGELES · BOSTON · CHICAGO · HOUSTON
CLEVELAND · SAN FRANCISCO · AKRON · AMARILLO
LONDON AND MANCHESTER, ENGLAND

uniformity
precision
dependability

UNITED

for processing

and other non-metallic materials

Roll making has been an important part of our business for 50 years.

Through research and development in roll design and manufacture, we have made important contributions to greater uniformity and accuracy in the product of rubber and other non-metallic processing machinery.

Our engineers specialize in the design of rolls for new or unusual requirements as well as for standard applications. Why not consult them on your next roll requirement?

GOLDEN ANNIVERSARY 1901 — 1951

UNITED ENGINEERING AND FOUNDRY COMPANY

PITTSBURGH, PENNSYLVANIA

Plants at Pittsburgh • Vandergrift • New Castle
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Subsidiaries: Adamson United Company, Akron, Ohio
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Designers and Builders of Ferrous and Non-Ferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other heavy machinery. Manufacturers of Iron, Nodular Iron and Steel Castings and Weldments.

Wire Your Reservation NOW

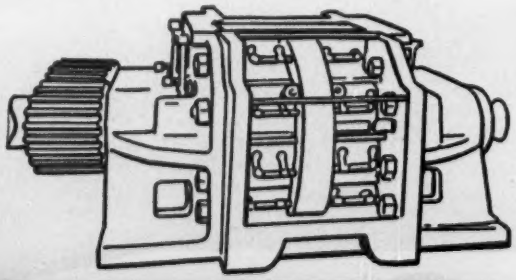
SAVE VITAL PRODUCTION TIME WITH IWS Specialized

BANBURY REBUILDING SERVICE

9 Safe Sure Steps . .

That Guarantee Your Mixer Body Will Be Restored To Full Efficiency

INTERSTATE REBUILDING SERVICE offers you two options: You can use our "PRE-PLAN" method to have your present body rebuilt and returned to you—or you can INTERCHANGE your old mixer body for one of ours, already completely rebuilt. Either way YOU SAVE valuable weeks of production time. Our facilities handle every size of Banbury, and we can fabricate any of the parts for any type.



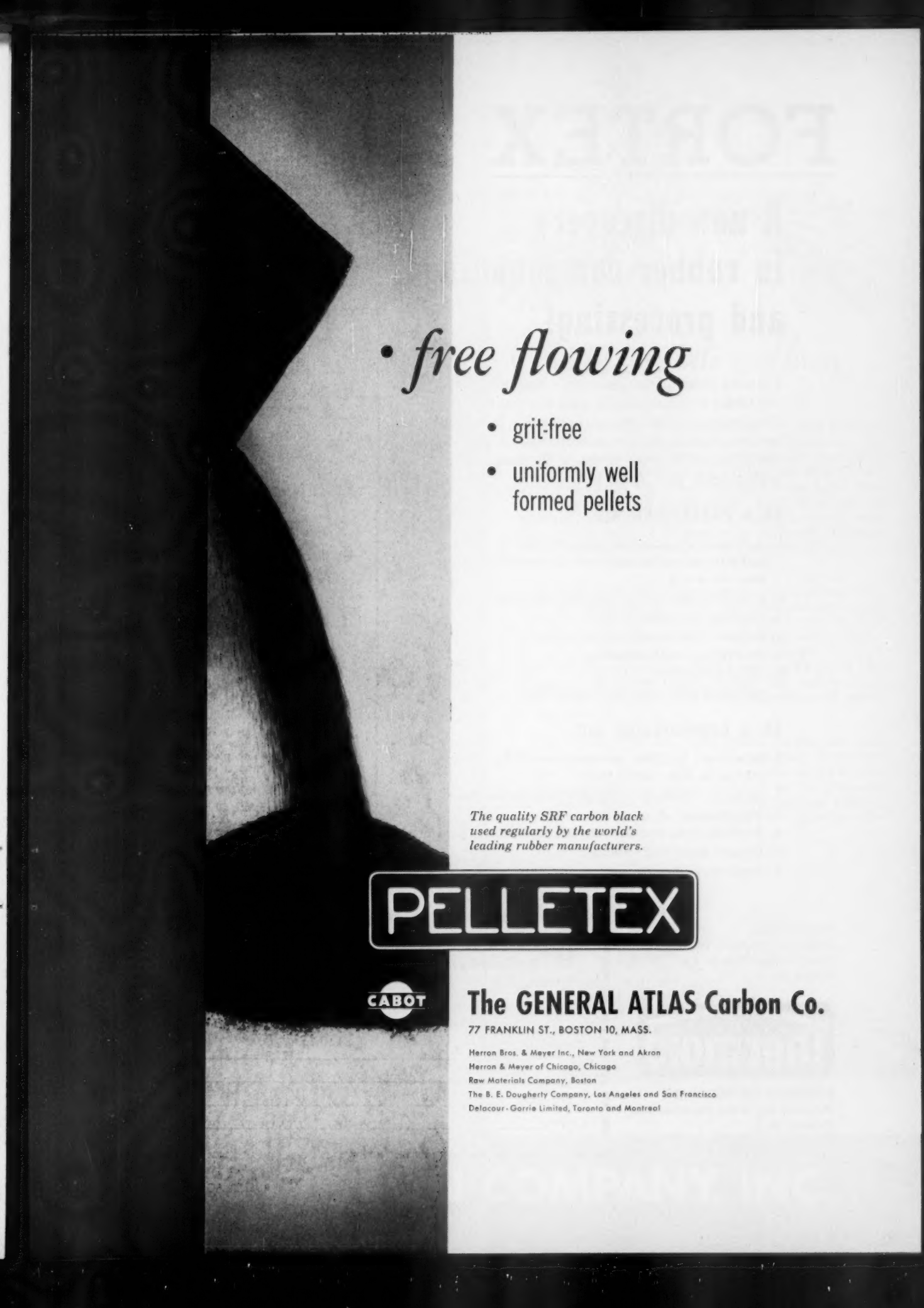
It costs you nothing to have the details—and an estimate. It might mean production savings in the thousands.

SERVING THE RUBBER INDUSTRY

EXCLUSIVE SPECIALISTS IN BANBURY MIXER REBUILDING

INTERSTATE WELDING SERVICE

Main Offices - Metropolitan Bldg., AKRON 8, OHIO Phone JE-7970



• *free flowing*

- grit-free
- uniformly well formed pellets

The quality SRF carbon black used regularly by the world's leading rubber manufacturers.

PELLETEX

CABOT

The GENERAL ATLAS Carbon Co.

77 FRANKLIN ST., BOSTON 10, MASS.

Herron Bros. & Meyer Inc., New York and Akron
Herron & Meyer of Chicago, Chicago
Raw Materials Company, Boston
The B. E. Dougherty Company, Los Angeles and San Francisco
Delacour-Gorrie Limited, Toronto and Montreal

FORTEX®

A new discovery in rubber compounding and processing!

Thermoid Chemical Co. announces a thoroughly tested new rubber chemical which is unique in that it acts as a low-temperature breakdown plasticizer. Far from diluting the stock on further compounding, it actually FORTifies and EXtends it—hence, its name. Its use yields a better stock at less cost.

AS A PROCESSING AID:

1. A breakdown plasticizer and peptizer in Banbury and internal mixing. Add directly to elastomer so it may also act as
2. a pigment wetting and dispersing agent and
3. anti-cross-link agent in GR-S.
4. Anti-scorch in mixing and processing.
5. Aids tubing and calendering.
6. Smooths Buna N.
7. Aids mold flow. Does not cause sticking.

AS A COMPOUNDING AID:

1. Reinforcer; hardness, modulus and tensile strength increase at same rate of cure.
2. Extender of elastomer by direct mix or co-coagulation.
3. Age resistant.
4. Replaces stearic acid and retarders in whole or in part.
5. Imparts better tear resistance.
6. Improves resilience.

Q. How does FORTEX fortify and extend?
A. A 5 to 10% extension of the elastomer gives physicals equivalent and sometimes superior to the original rubber.

Q. What is the composition of FORTEX?
A. It's a partially aromatized hydrophenanthrenic material of vegetable origin, chemically treated to block unsaturation.

Q. What are its properties?
A. FORTEX is a viscous, brown liquid, with characteristic odor disappearing completely on mixing and curing. It is non-toxic. Requires warming for easy pouring. Specific gravity: 1.04.

Q. Is it compatible with all elastomers?
A. FORTEX is highly compatible with all elastomers except polysulphide rubbers.

Q. How is it added to the elastomer?
A. Directly for elastomer breakdown, or otherwise as a regular plasticizer.

Q. How does FORTEX compare with conventional peptizers?
A. As a breakdown plasticizer, FORTEX prevents cross-linkage and maintains molecular weight in the softened elastomer.

Q. How does it work in internal mixers?
A. Free flowing FORTEX incorporates rapidly to produce relatively smooth plasticized rubber with no increase in mixing time.

Q. Will FORTEX replace stearic acid?
A. It can replace all or part of the stearic acid in the recipe.

Distributed by
Herron Bros. & Meyer, Inc.
Akron, O., New York, N. Y.,
Chicago, Ill.

Thermoid

THERMOID CHEMICAL CO.
A Subsidiary of the Thermoid Co.
Trenton, N. J.

THERMOID CHEMICAL CO.
220 Whitehead Road
Trenton, N.J.

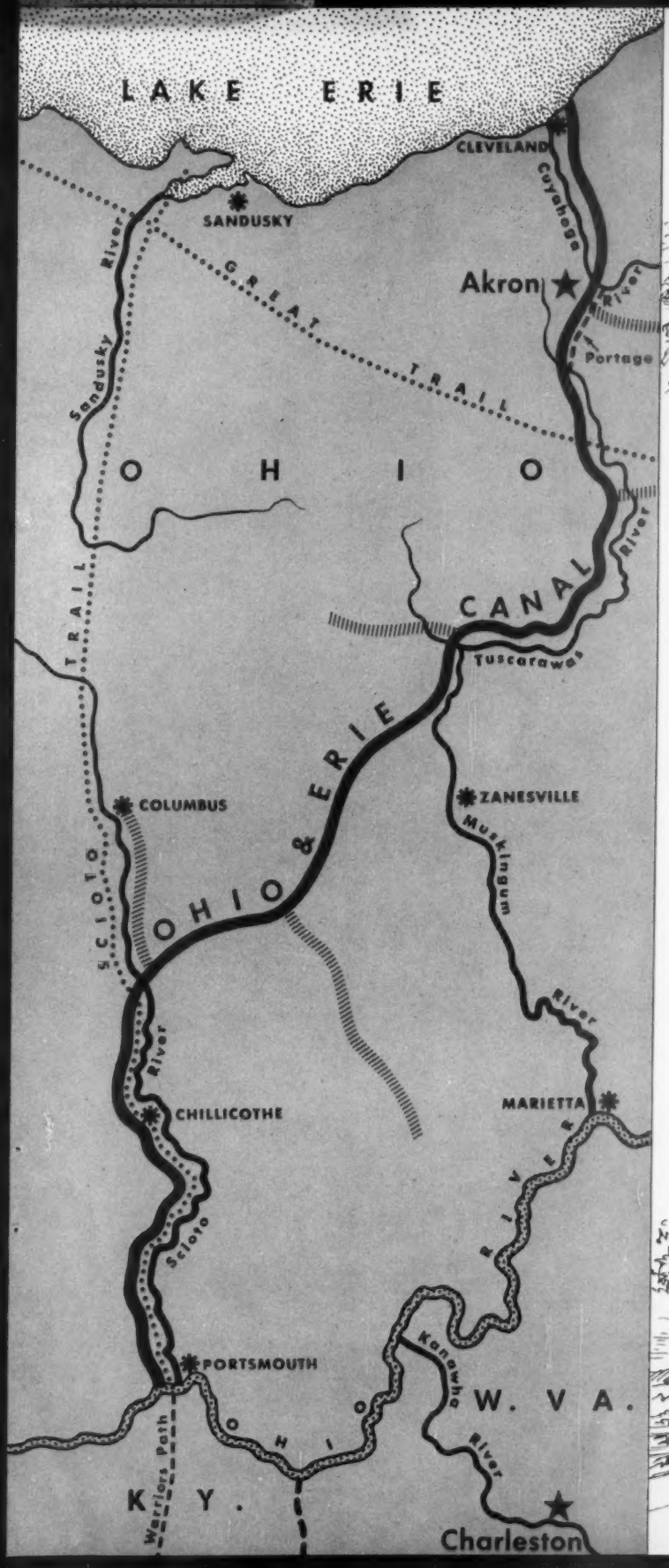
Please send me full details on FORTEX as an aid in rubber compounding and processing.

NAME_____ TITLE_____

COMPANY_____

ADDRESS_____

CITY_____ ZONE____ STATE_____



Getting Into Akron

On July 4, 1827, two years after De Witt Clinton had lifted the first spadeful of earth beginning the project, a boat took off from Akron for Cleveland on the first completed section of the Ohio Erie Canal. Five years later the canal stretched from Lake Erie to Portsmouth, 309 miles away, built at a cost of $7,904,971. The peak year in the canal's history was 1851, when $432,711 in fees were collected. Though its importance diminished, the canal continued as a carrier of coal and lumber until 1913.

How far man has progressed in transporting himself and his products! From the principal city along the old canal now flows daily the great contribution to man's swift movement . . . rubber tires. No community in the country is today as distant as once were the shores of Lake Erie from the banks of the beautiful Ohio. On trucks, buses, and automobiles the rubber tire has given man undreamed-of speed in movement.

The rubber tire has been given longer life and better wearing qualities by the addition of carbon black. Carbon black, ever equal to the needs of the rubber industry, is our contribution to the progress in transportation and to Akron, the rubber capital of the world, once an important way point on the Ohio Erie Canal.

UNITED CARBON COMPANY, INC.

We furnish the rubber industry with these well-known carbon blacks of outstanding quality —

UNITED BLACKS

Kosmos 20 - - SRF — Semi-Reinforcing Furnace
Kosmos 40 - - HMF — High Modulus Furnace
Kosmos 50 - - FEF — Fast Extrusion Furnace
Kosmos 60 - - HAF — High Abrasion Furnace
Kosmobile S - - HPC — Hard Processing Channel
Kosmobile HM - MPC — Medium Processing Channel
Kosmobile S-66 MPC — Medium Processing Channel
Kosmobile 77 - EPC — Easy Processing Channel

UNITED BLACKS

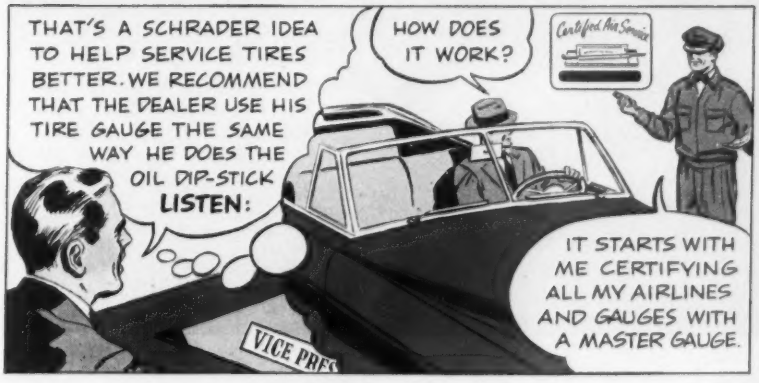
Discerning rubber compounders obtain their excellent results in a variety of stocks when using our quality blacks.

UNITED CARBON COMPANY, INC.

CHARLESTON 27, W. VA.

NEW YORK AKRON CHICAGO BOSTON
CANADA: CANADIAN INDUSTRIES, LTD.

Schrader Contributions to the Tire Industry


THAT'S A SCHRADER IDEA TO HELP SERVICE TIRES BETTER. WE RECOMMEND THAT THE DEALER USE HIS TIRE GAUGE THE SAME WAY HE DOES THE OIL DIP-STICK LISTEN:
HOW DOES IT WORK?
IT STARTS WITH ME CERTIFYING ALL MY AIRLINES AND GAUGES WITH A MASTER GAUGE.
VICE PRES

...I INFLATE TO RECOMMENDED PRESSURE APPLYING THE HEAT BUILD-UP FORMULA FOR SAFEST DRIVING, RIDING COMFORT AND STEERING EASE. THEN I SEAL IN THE AIR WITH THIS VALVE CAP.
IT SURE SOUNDS GOOD TO ME.
VICE PRESIDENT

And it sounds good to the many dealers who are now using Certified Air Service as part of their regular procedures . . . and it helps them service and sell tires. This is but one example of the service behind Schrader Tire Valve Equipment that extends right down to the car owner.

Have you seen a copy of the Certified Air Service procedure manual? Write for Manual D-200.

A. SCHRADER'S SON, 470 VANDERBILT AVE., BROOKLYN 17, N. Y.
Division of Scovill Manufacturing Company, Incorporated

Schrader
REG U S PAT OFF

FIRST NAME IN TIRE VALVES
FOR ORIGINAL EQUIPMENT AND REPLACEMENT

THIS HOT SPRAY GIVES CORROSION A COLD SHOULDER

THE photograph above shows a very important operation in the manufacture of aluminum insert tire molds in our Athens, Ohio plant.

Wherever an aluminum insert is to be used the cavity is sprayed with molten aluminum to provide a positive means of preventing electrolytic corrosion of the insert. This spray coat of molten aluminum forms an integral bond with cast iron, cast, forged or welded steel . . . avoids the contact of aluminum inserts with a dissimilar metal.

Metalizing is typical of the care with which we approach every step in the making of tire molds. Our plant at Athens is, we believe, the only plant in the world devoted exclusively to tire mold manufacture. Here, specialized machines and machine tools (many of our own design) and craftsmen thoroughly skilled in their use, produce tire molds of superlative quality — and at decidedly favorable cost.

ATHENS MACHINE DIVISION

THE BRIDGWATER MACHINE COMPANY

Akron, Ohio

FOR BETTER MOLDS FOR BETTER TIRES *SPECIFY* BRIDGWATER

Illustration courtesy of
The Murray Corp., Detroit

If you're looking at the bath mat...

then you'll realize that NEVILLE plays an important part in the production of many household items, whether it's a bath-mat, stair-treads, drain-mats, floor-tile or molded electric plugs, as well as enamels, paints or varnishes. In countless every-day products, quality and durability are assured when the manufacturer uses

NEVILLE

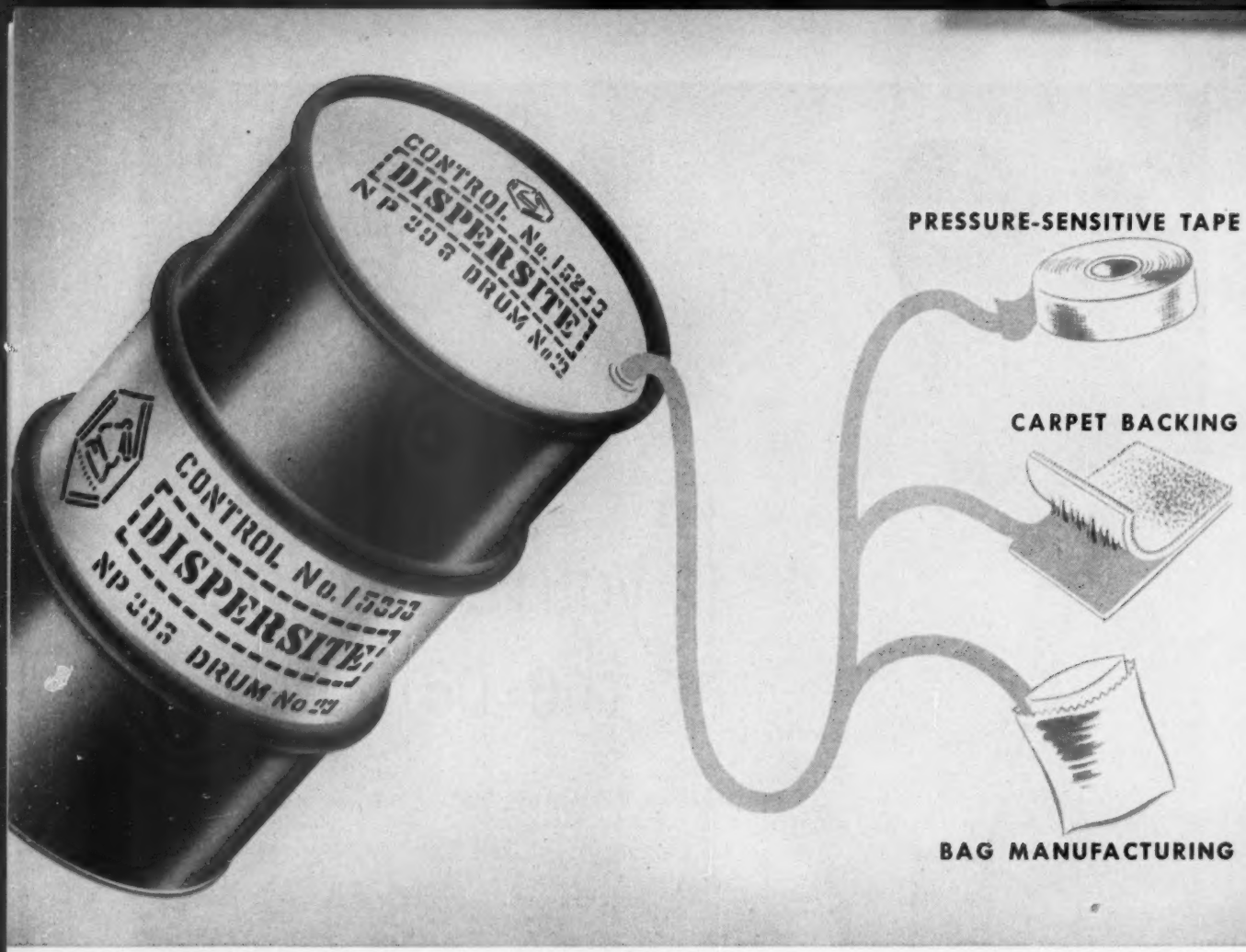
COUMARONE RESINS

PRODUCTS OF TOMORROW FROM THE CHEMICALS OF TODAY

Tell us your particular need—we'll help you select the right Neville chemical for your purpose.

THE NEVILLE COMPANY
PITTSBURGH 25, PA.
Plants at Neville Island, Pa., and Anaheim, Cal.

C-4



For adhesives that hold – *it's Dispersite*®

Whatever you bond, you can be sure your adhesive will stick to its job—with Dispersite. These dispersion adhesives of reclaimed rubber or other elastomers have both the tackifier and reinforcing material within the latex particle – provide more uniform tackiness and smoother, stronger adhesion.

Specially developed by Naugatuck Chemical—the pioneer and leader in fine latices—Dispersite offers manufacturers many distinct advantages. Applied by roller, spraying, dipping, or brushing, Dispersite is fast-drying—forms a tough, flexible film with exceptional tackiness, good mechanical stability and excellent aging properties. It retains its adhesive properties over a wide temperature range. And, since Dispersite is a water dispersion, it eliminates the danger of fire.

Modifications of Dispersite make it ideal for use as a saturant or size for carpet backings, for bonding or coating textiles and fibers such as jute or felt, and for a variety of dipping applications. **For further information on Dispersite, or for expert help on any bonding or coating problem, write to the address below.**

NAUGATUCK *Chemical*

DIVISION OF UNITED STATES RUBBER COMPANY

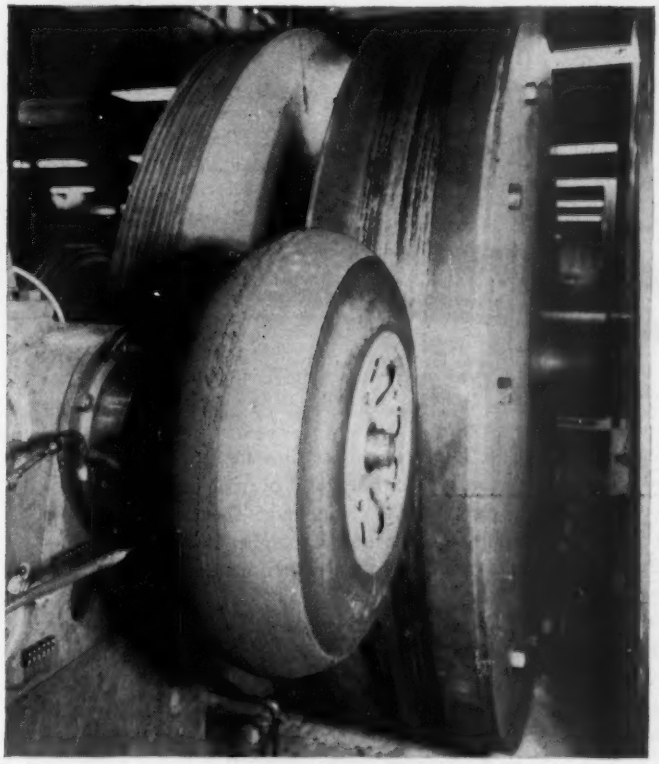
101 ELM STREET, NAUGATUCK, CONNECTICUT

BRANCHES: Akron • Boston • Charlotte • Chicago • Los Angeles • New York • Philadelphia • Memphis • In Canada: Naugatuck Chemicals, Elmira, Ont.

Rubber Chemicals • Aromatics • Synthetic Rubber • Plastics • Agricultural Chemicals • Reclaimed Rubber • Latices

BRAKES FOR —SUPERSONIC SPEEDERS—

... PRE-TESTED THE WORLD OVER ON ADAMSON UNITED AIRCRAFT BRAKE AND TIRE-TESTING MACHINES



Striking examples of the versatility of Adamson engineering are the Brake and Tire-Testing Machines Adamson builds for the aircraft industry.

Simulating the landing of jet-propelled or other planes of practically any weight, at any given speed, they test the fitness of aircraft brakes and tires for use in actual service. A machine capable of testing the wheels and brakes of a 280-ton, jet-propelled job, landing at speeds above 250 miles an hour, is under construction.

Hydraulics, pneumatics, new and involved instrumentation and unusual control devices including radically new types of brakes for conducting fatigue tests on tires, and for regulating the speed of inertia wheels, are involved. Inertia wheels on some of the larger machines are 16 feet in diameter, weigh 185 tons, rotate at peripherial speeds of 200 miles an hour, and develop 212,000,000 foot-pounds of kinetic energy, yet are so accurately balanced that maximum machine vibration is held within .0005 and .001 of an inch.

As consultants to the U. S. Army Air Force, the U. S. Navy Air Force, the National Advisory Committee for Aeronautics, and to numerous aircraft manufacturers and brake equipment companies throughout the world, we have designed and/or built more machines of this type than all other manufacturers combined.

It may be that brake and tire-testing equipment will never be required in your operation, but keep in mind that Adamson's engineering abilities are available to design and build for you precision machinery not only for the aircraft industry or for the manufacture of rubber or plastics but for whatever may be your purpose.

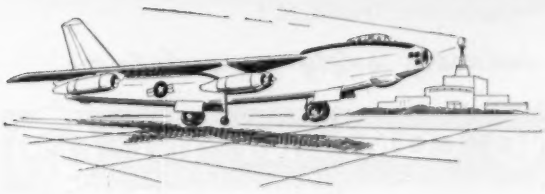
We invite you to consult us on your next project. You will not be obligated.

Adamson United Company

730 Carroll Street, Akron 4, Ohio

Sales Offices In Principal Cities

Subsidiary of United Engineering and Foundry Company
Plants at: Pittsburgh • Vandergrift • New Castle
Youngstown • Canton



Adamson United

AIRCRAFT BRAKE AND TIRE-TESTING MACHINES

DIP-PROCESS RECLAIMS

(Made in our Patented Reclaimator)

Keep QUALITY HIGH.... PRICES LOW

... ON ALL TYPES OF RUBBER PRODUCTS

Over 250 members of the Rubber Division of the American Chemical Society recently inspected our new plant and watched scrap tires being converted into finished reclaim in less than half an hour. They saw the extremely short devulcanization cycle by which our patented RECLAIMATOR imparts the high quality, uniformity and superior processing characteristics to DIP-PROCESS RECLAIMS.

These factors make Dip-Process Reclaims preferred for most applications, This demonstration directed the attention of rubber technicians to the greatest advance of the past fifty years in reclaiming of vulcanized rubber.

U. S. Dip-Process Reclaims are more uniform, less scorchy, mix faster and overcome the lack of tack in high GR-S compounds. They also *save you* substantially by permitting higher loadings of reinforcing fillers with no deterioration of physical properties.

Write us now for test sample and prove these points to your own satisfaction.

Always keep reclaims in your formula and always look to U. S. for the best. U. S. Rubber Reclaiming Company, Inc., P. O. Box 365, Buffalo 5, N. Y. Trenton agent: H. M. Royal, Inc., 689 Pennington Ave., Trenton, N. J.

69 years serving the industry solely as reclaimers

U.S. RUBBER RECLAIMING COMPANY, INC.

For better tensile and tear...

The white reinforcing pigment Hi-Sil, a hydrated silica, is known throughout the rubber industry for the superior properties it imparts to non-black goods. It is accepted as standard where highest quality is imperative.

Now, tests just completed using the new Hi-Sil "C" reveal startling increases over regular Hi-Sil, especially in tensile and tear. Following are the test results.

NATURAL RUBBER (Cures at 287°F)

RECIPE			
No. 1 RSS	100	DOTG	1.2
Zinc Oxide	5	Stearic Acid	3
PBNA	1	Triethanolamine	1
Sulfur	3	Pigment (30 vol.)	58.5
MBTS	0.8		

Pigment	Cure	Modulus 300%	Tensile	Elongation	H	Tear
HI-SIL	10	2110	3630	470	68	610
	15	2200	3390	440	68	580
	30	2110	3110	420	72	520
HI-SIL "C"	10	1230	3530	620	68	780
	15	1380	3660	620	72	800
	30	1450	3550	580	76	710

GR-S (Cures at 280°F)

RECIPE			
GR-S 1000	100	TMTDS	0.15
Zinc Oxide	5	Diethylene Glycol	3.5
PBNA	1	100°C. m.p. coumarone indene resin	15
Sulfur	3	Pigment (30 vol.)	58.5
MBTS	1.2		

Pigment	Cure	Modulus 300%	Tensile	Elongation	H:0″	H:30″	Tear
HI-SIL	15	750	2570	630	66	56	180
	30	840	2520	580	66	57	170
	60	790	2480	560	67	60	150
HI-SIL "C"	15	650	3300	720	68	57	340
	30	900	3400	590	76	66	320
	60	975	3300	575	77	67	290

LTP (Cures at 280°F)

RECIPE			
GR-S 1500	100	Triethanolamine	1
Zinc Oxide	5	Stearic Acid	3
PBNA	1	100°C. m.p. coumarone indene resin	10
Sulfur	3	Pigment (30 vol.)	58.5
MBTS	0.75		
DOTG	1.5		

Pigment	Cure	Modulus 300%	Tensile	Elongation	H:0″	H:30″	Tear
HI-SIL	30	890	3190	720	58	53	230
	45	940	3220	680	60	54	230
	60	880	3190	660	60	55	230
HI-SIL "C"	30	440	3570	760	62	55	350
	45	610	3760	700	64	58	340
	60	680	3570	660	65	60	360

GR-I (Cures at 307°F)

RECIPE			
GR-I	100	Zenite	1
Zinc Oxide	5	BxDc	1
Sulfur	2	Diethylene Glycol	2.5
Tellurac	1	Pigment (20 vol.)	39

Pigment	Cure	Modulus 500%	Tensile	Elongation	H:0″	H:30″	Tear
HI-SIL	10	440	1960	850	44	35	210
	20	640	2230	780	47	39	150
	60	1020	1600	600	50	43	110
HI-SIL "C"	10	340	2310	940	47	38	310
	20	530	2680	860	50	42	260
	60	980	2300	670	53	47	170

NEOPRENE (Cures at 287°F)

RECIPE			
Neoprene GN	100	MBTS	1
Zinc Oxide	5	Sodium Acetate	1
PBNA	1	Light Process Oil	10
ELC Magnesia	4	Pigment (20 vol.)	39

Pigment	Cure	Modulus 300%	Tensile	Elongation	H:0″	H:30″	Tear
HI-SIL	30	720	1600	630	57	43	220
	45	1250	2610	610	57	53	360
	60	1290	2260	540	56	53	390
HI-SIL "C"	30	1400	3060	620	57	53	480
	45	1570	3260	570	58	55	500
	60	1500	3080	580	60	57	460

Sample quantities of Hi-Sil "C" are available for your evaluation. Limited commercial shipments are ready from our interim plant production. Contact our Pittsburgh office.

COLUMBIA-SOUTHERN
CHEMICAL CORPORATION
SUBSIDIARY OF PITTSBURGH PLATE GLASS COMPANY
FIFTH AVE. AT BELLEFIELD · PITTSBURGH 13, PA.

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SAN FRANCISCO

THE COMPANY'S new plasticizer plant includes a modern processing unit and this large tank farm for raw materials and finished plasticizers.

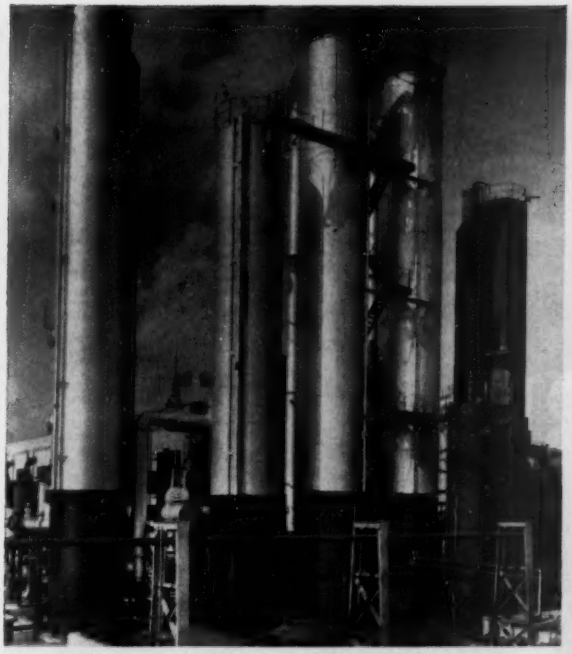
1 **SOURCE** of basic coal chemicals for PX Plasticizers is this battery of 140 coke ovens. Fed from large coal stock piles in foreground, they operate around the clock.

NEW BASIC PLASTICIZER

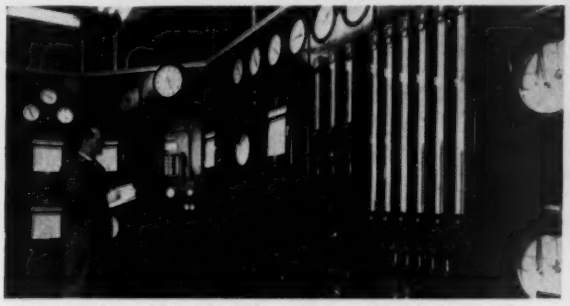
Controls quality from coal

ONE million pounds per month have been added to the nation's plasticizer production capacity with the completion of Pittsburgh Coke & Chemical Company's new plasticizer plant this month. Erected at Neville Island, near Pittsburgh, Pa., the new plant is located in the heart of one of our most plentiful sources of coal and other important raw materials.

Pittsburgh's new plant is completely integrated with the company's basic coal chemical production facilities at Neville Island. Molten phthalic anhydride, for example, is piped directly to the plasticizer plant from Pittsburgh's adjoining phthalic plant. As a result of this unique basic and integrated position, the new



2 **BASIC** coal chemicals used in making PX Plasticizers are recovered from coke ovens in modern chemical equipment like this at Pittsburgh's integrated plant.



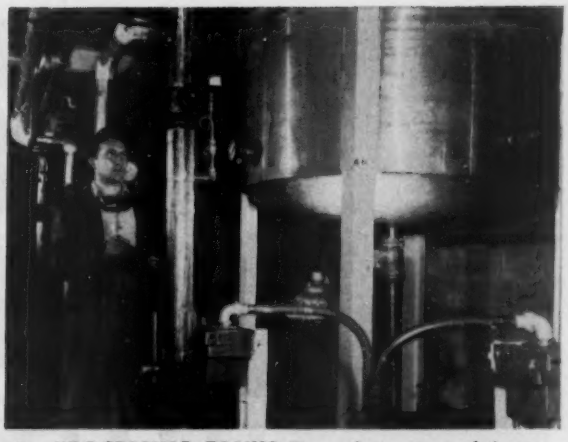
3 **HIGH QUALITY** of phthalic anhydride, important plasticizer intermediate, is rigidly maintained. Pittsburgh's molten phthalic is piped directly to plasticizer plant.

PLANT IN PRODUCTION

to finished product

plant can produce clear, water-white plasticizers that are quality controlled from coal to finished product.

Customers of Pittsburgh Coke & Chemical are assured of two other important benefits because of the company's ability to control every phase of plasticizer production: (1) Plasticizers of consistent peak quality, regardless of whether shipments are made by the pound or by the tank carload. (2) Prompt deliveries and continuing supplies, regardless of varying market conditions affecting material supplies.



4 **PROCESSING TANKS** like a large part of the new plant's equipment, are made of stainless steel to help protect the quality and purity of finished plasticizers.

5 **DRUMMING OFF** Pittsburgh PX Plasticizers is accomplished on special filling scales. When correct weight is attained, flow of plasticizer is automatically stopped.

WBD4424

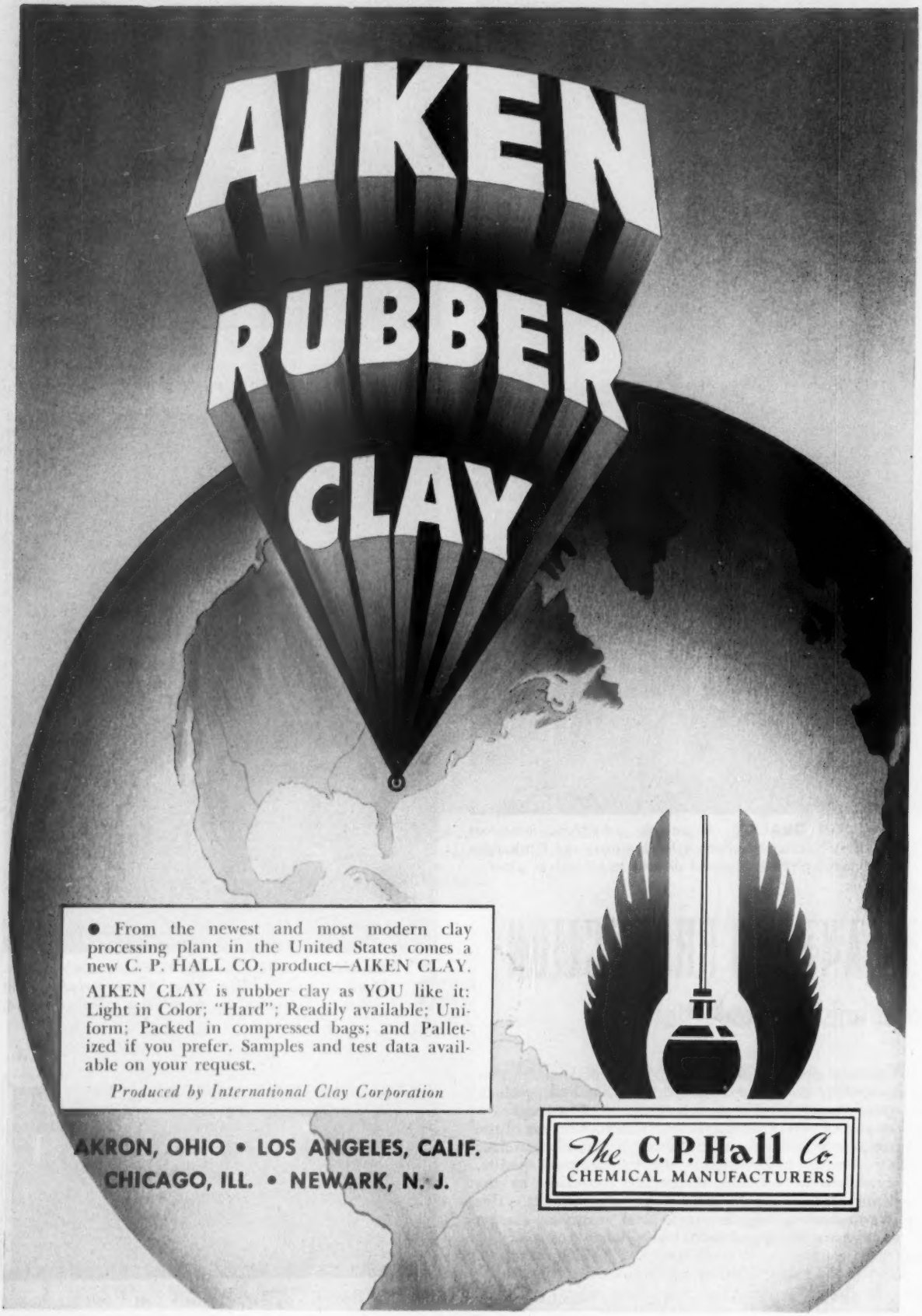
PLASTICIZER DIVISION

PITTSBURGH

COKE & CHEMICAL CO.

Grant Building - Pittsburgh 19, Pa.

COAL CHEMICALS • AGRICULTURAL CHEMICALS • FINE CHEMICALS • PROTECTIVE COATINGS • PLASTICIZERS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON



● From the newest and most modern clay processing plant in the United States comes a new C. P. HALL CO. product—AIKEN CLAY.

AIKEN CLAY is rubber clay as YOU like it: Light in Color; "Hard"; Readily available; Uniform; Packed in compressed bags; and Palletized if you prefer. Samples and test data available on your request.

Produced by International Clay Corporation

AKRON, OHIO • LOS ANGELES, CALIF.
CHICAGO, ILL. • NEWARK, N. J.

The **C. P. Hall Co.**
CHEMICAL MANUFACTURERS

AZO-ZZZ-55 zinc oxide

AZO ZZZ-55

Uniform particle size and absence of extreme "fines" assures good dispersion and easy processing.

AMERICAN ZINC SALES CO.

Distributors For

AMERICAN ZINC, LEAD & SMELTING CO.
COLUMBUS, O. CHICAGO
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For IMPROVED RUBBER FLOOR TILE with . . . .

EASY PROCESSING

Reinforcing High Styrene Resin

Marbon "8000"

It BLENDS as it STRENGTHENS as it IMPROVES

Use Marbon "8000" in rubber floor tile for faster pigment dispersion with less heat and power and improved calender release; plus dimensional stability, flexible toughness, less blistering and spot porosity, scratch and scuff-resistance, and for improved gloss and depth of color.

ORDER NOW! STOCK READILY AVAILABLE!

Marbon

MARBON CORP.

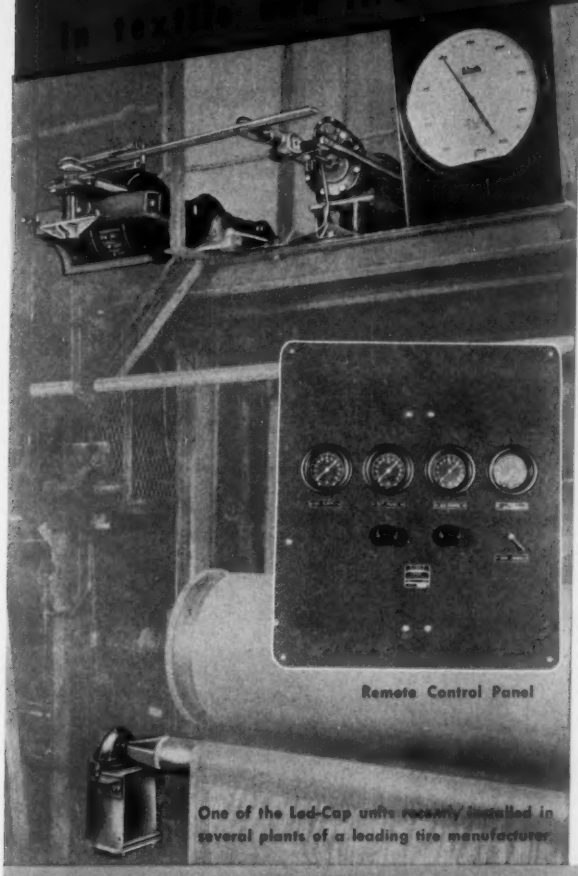
GARY, INDIANA

SUBSIDIARY OF BORG-WARNER

It BLENDS as it STRENGTHENS as it IMPROVES

Put the Brakes on the Breaks with LOD-CAP

in textile and tire manufacture, paper, plastics, tape



Remote Control Panel

One of the Lod-Cap units recently installed in several plants of a leading tire manufacturer

AUTOMATIC *and* Remote Control *of* Fabric Tension

The installation shown at the left may be manually controlled, as in starting a new run. When set for automatic control, the LOD-CAP will instantly correct tension to control point, whenever tension increases or decreases beyond any predetermined setting.

Reduces Breaks and Tears— Cuts Down-Time to a Minimum

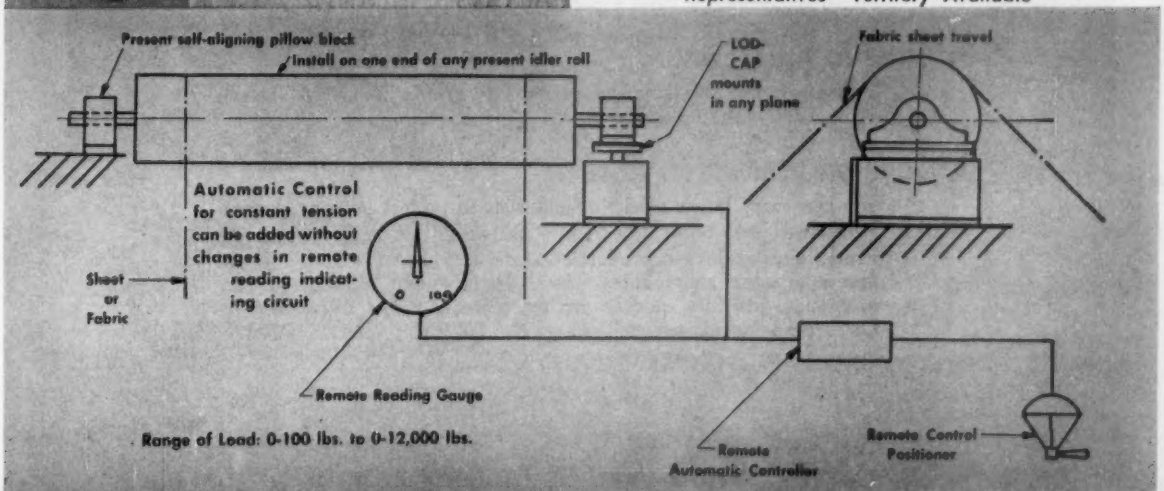
An installation costs approximately $1000 per unit to replace manually operated controls that cost $4000 per unit. Remote control of several machines can be centralized.

Keep Product Uniform with LINK LOD-CAPS

They're small in size, self-contained, easily installed.

Write for Index 4H with complete information about this newest method of tension indication and control

Representatives—Territory Available


Present self-aligning pillow block
Install on one end of any present idler roll
LOD-CAP mounts in any plane
Fabric sheet travel
Automatic Control for constant tension can be added without changes in remote reading indicating circuit
Sheet or Fabric
0
100
Remote Reading Gauge
Range of Load: 0-100 lbs. to 0-12,000 lbs.
Remote Automatic Controller
Remote Control Positioner

Link ENGINEERING COMPANY

13843 ELMIRA AVENUE DEPT. H3 DETROIT 27, MICH.

PROTOX Zinc Oxides Stack HIGHER and DENSER

EXPAND *YOUR* STORAGE SPACE WITH PROTOX...

Cut costs 3 ways!

Protox-166 more than doubled the zinc-oxide storage capacity of this warehouse. Three 60-bag unit loads (4.5 tons) occupy the same floor space as two 42-bag units (2.1 tons) of a conventional zinc oxide packaged in the usual way.

You can load up to 50% more Protox on each skid or pallet — because bags of Protox are denser than conventional zinc oxides.

You can stack pallet-loads of Protox higher — because bags of Protox are flatter, make a more stable load.

These Protox advantages expand your storage space and save you dollars in these important ways:

1. Save on storage costs

You can store more Protox per square foot of floor space.

2. Save in purchasing

Take advantage of c.l. vs. l.c.l. prices. Buy Protox in carloads instead of conventional zinc oxides in l.c.l. quantities.

3. Save on production costs

You can carry larger stocks of materials to protect your production schedules.

Protox zinc oxides cut production costs in other ways, too. You can process Protox zinc oxides faster. Their unique coating of zinc propionate provides quicker mixing, more complete dispersion, reduces need for masterbatching.

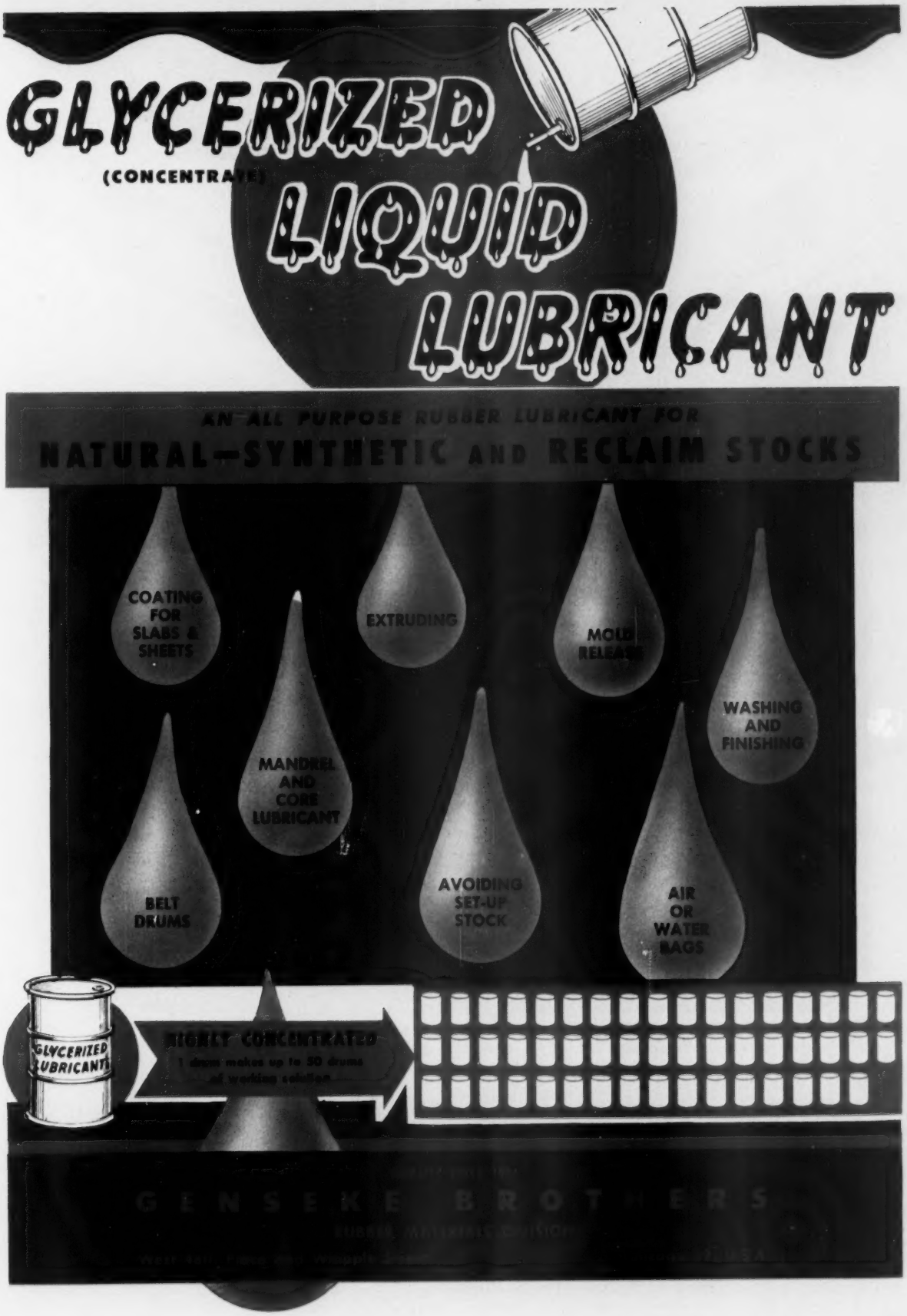
THE NEW JERSEY ZINC COMPANY

Producers of Horse Head Zinc Pigments

... most used by rubber manufacturers since 1852

160 Front Street, New York 38, N. Y.

HORSE HEAD PRODUCTS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GLYCERIZED LUBRICANT
HIGHLY CONCENTRATED
1 drum makes up to 50 drums of working solution
GENESEE BROTHERS

If it's got to have CONSTANTLY UNIFORM QUALITY...

make it Wellington Sears "Columbus Sheeting"—a superior fabric for rubberizing

One of the most versatile industrial fabrics in the entire Wellington Sears line, Columbus sheeting has long been outstanding for its constantly uniform quality. Yard after yard, this lighter weight fabric is an absolute minimizer of headaches in production and inspection.

Columbus sheetings are made 40 to 120 inches wide in weights from 2 to 5 ounces per square yard. Whether it's for rubberized mechanical goods such as friction tape and cable wrappings, or for such rubber-coated products as hospital sheeting and service raincoats, or any use demanding high quality throughout, you'll find Columbus sheeting a versatile performer for your needs.

Additional Wellington Sears fabrics for coating, specialties and mechanical rubber goods are listed at right. Your nearest Wellington Sears sales office will supply you with full information on your rubber-and-fabric requirements.

An illustrated 24-page booklet filled with valuable facts on fabric development and applications of interest to present and potential users of industrial fabrics is yours for the asking. Write for a free copy of "Modern Textiles for Industry" to Wellington Sears Co., Dept. L-5, 65 Worth Street, New York 13.

Superior Fabrics for the Rubber Industry

- Belting duck
- Hose duck
- Enameling duck
- Army duck
- Single and plied-yarn chafers
- Sheeting
- Airplane cloth
- Balloon cloth
- Nylon, high-tenacity rayon, other synthetics and combinations.

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A SUBSIDIARY OF WEST POINT MANUFACTURING COMPANY

FIRST In Fabrics For Industry

WELLINGTON SEARS COMPANY, 65 WORTH STREET, NEW YORK 13, N. Y.

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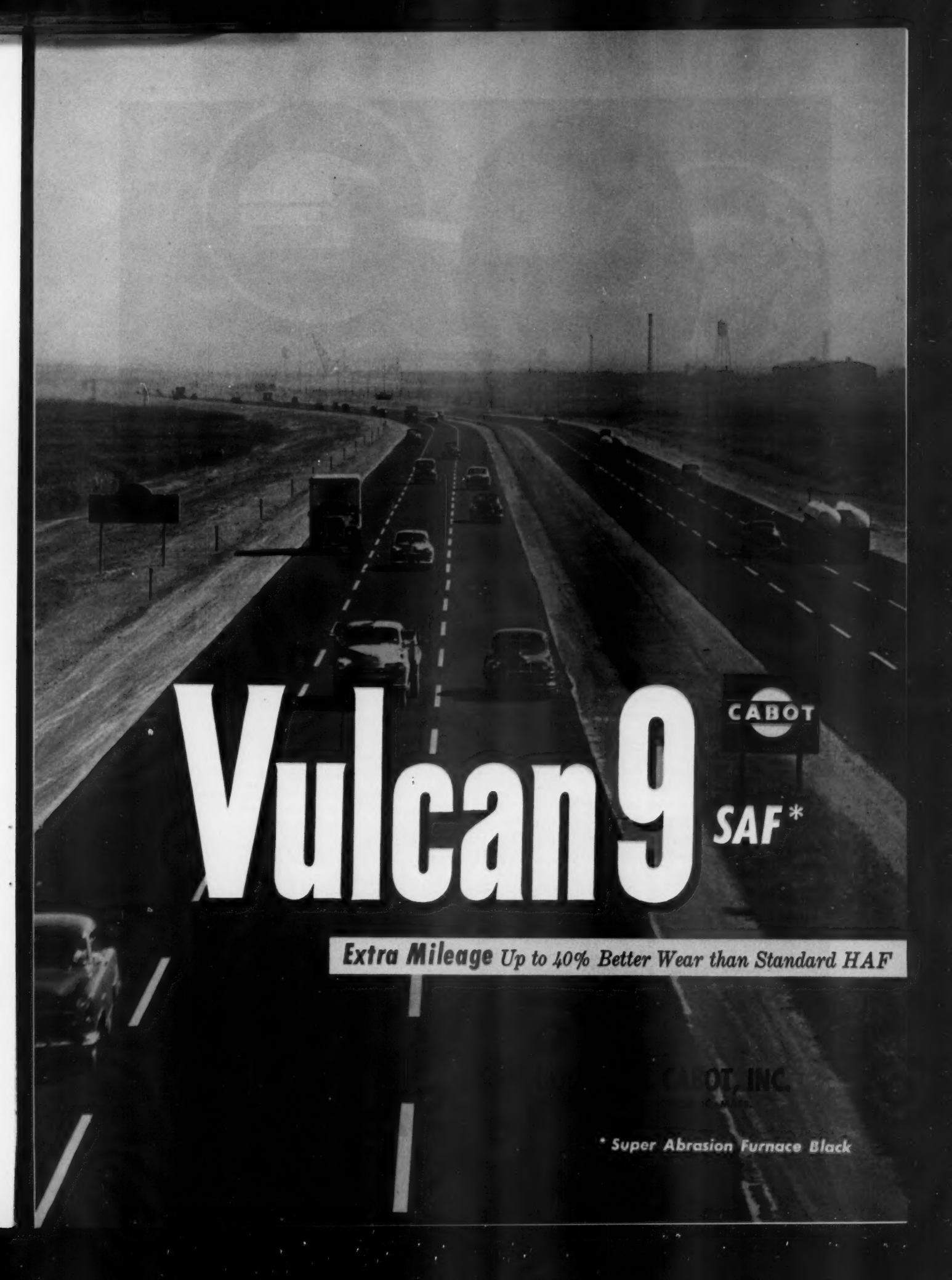
Vulcan 9
SAF*
CABOT
Extra Mileage Up to 40% Better Wear than Standard HAF
OT, INC.
* Super Abrasion Furnace Black

"Every dollar --double duty..."

HARVEY S. FIRESTONE, JR.
Chairman, The Firestone Tire and Rubber Company

"Every dollar invested in U.S. Defense Bonds does double duty. Through the Payroll Savings Plan we help in the building of national defense and, at the same time, provide for personal security in the years to come. The Firestone organization is proud that more than 29,000 of our employees are participating in the Payroll Savings Plan."

Do America's wage earners appreciate that double duty feature of Defense Bonds? Let's take a quick look at a few figures:

- 7,500,000 employed men and women are investing *one hundred and fifty million dollars per month* in Defense Bonds through the Payroll Savings Plan.
- The number of Payroll Savers is going up steadily.
- In the first six months of this year, sales of Series E $25 and $50 Bonds—the payroll savers' sizes—totaled 33,946,000 pieces—an increase of 22% over the corresponding period of 1951.
- Sales of E Bonds in January-June, 1952 totaled $1,715 million—5% more than in the same period of 1951. (The Payroll Savings Plan is the backbone of E Bond sales.)
- Today Americans hold a cash value of more than $49 billion in Savings Bonds. Their holdings of E Bonds—the Series bought by Payroll Savers—are now $35 billion—$5 billion greater than at the end of the war.

What are *you* doing to help *your* employees build for national defense and personal security?

If you have a Payroll Savings Plan, and participation is less than 50%, conduct a person-to-person canvass of employees of your plants and offices. Make sure that a Payroll Application Blank is placed in the hands of every employee. He or she will do the rest. Participation in your Plan will jump to 60%, 70%—even higher, as it has in hundreds and hundreds of plants that have conducted similar canvasses.

If you do not have the Payroll Savings Plan, phone, wire or write to Savings Bond Division, U.S. Treasury Department, Suite 700, Washington Building, Washington, D. C. Your State Director will help you to install the Plan—or to conduct a person-to-person canvass.

The U. S. Government does not pay for this advertising. The Treasury Department thanks, for their patriotic donation, the Advertising Council and

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is being adopted by most
rubber manufacturers
to obtain the best
adhesion of RUBBER
to RAYON and NYLON
SUPPLY HAS BEEN SHORT BUT GEN-TAC LATEX
IS NOW AVAILABLE!
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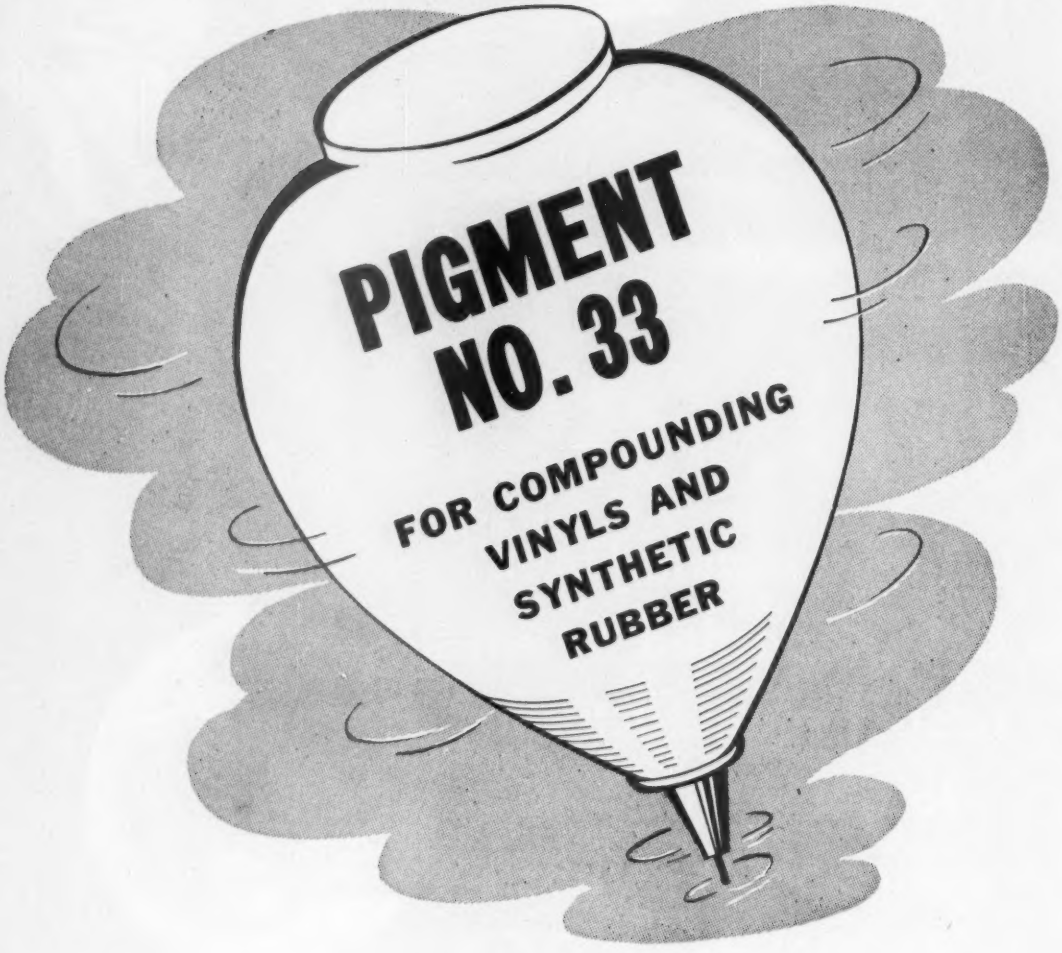
IT'S "TOPS"



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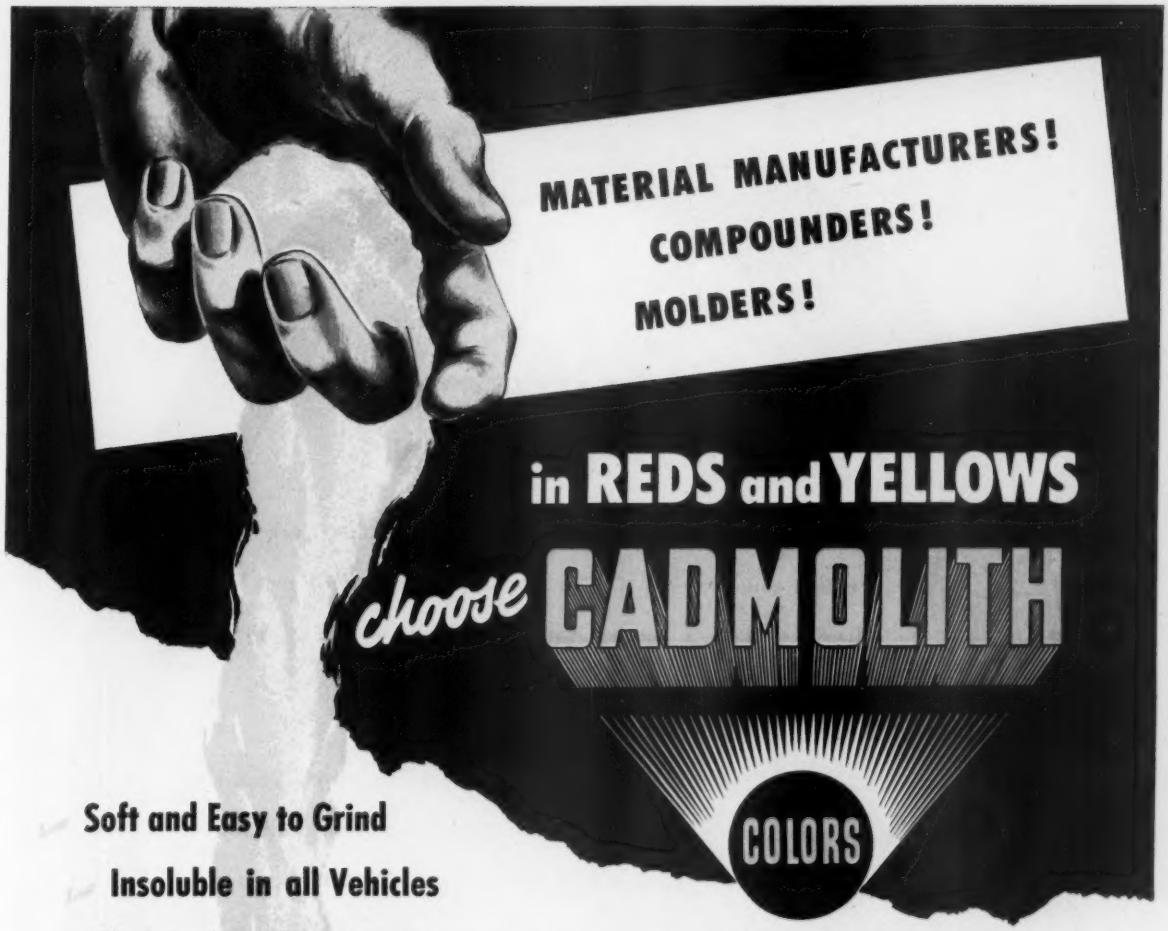

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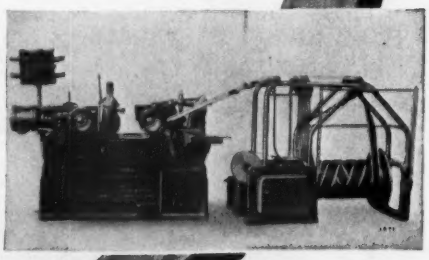

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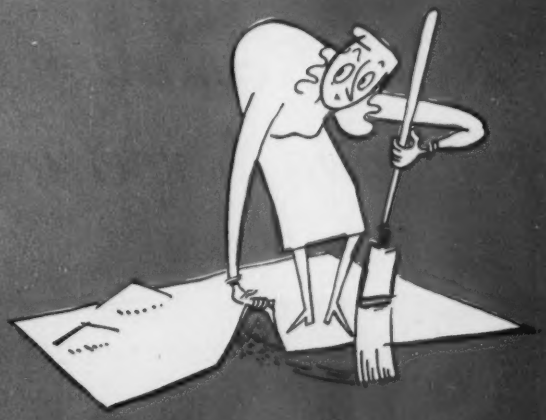

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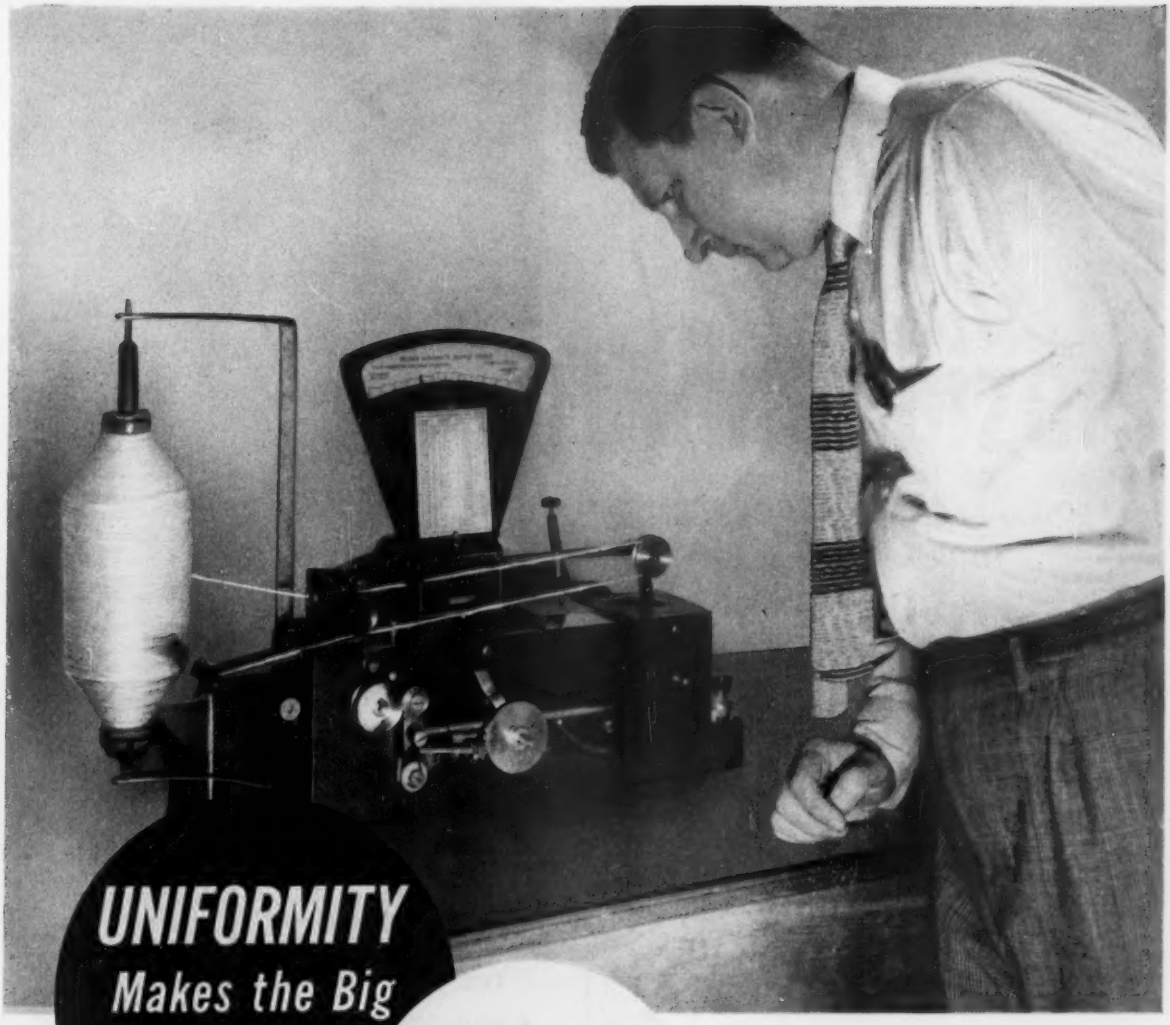

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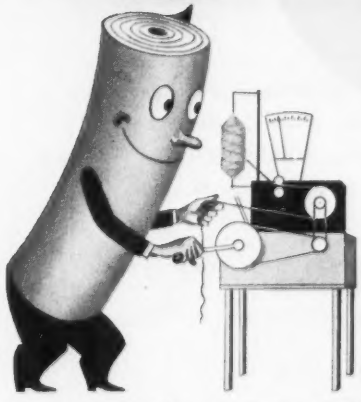

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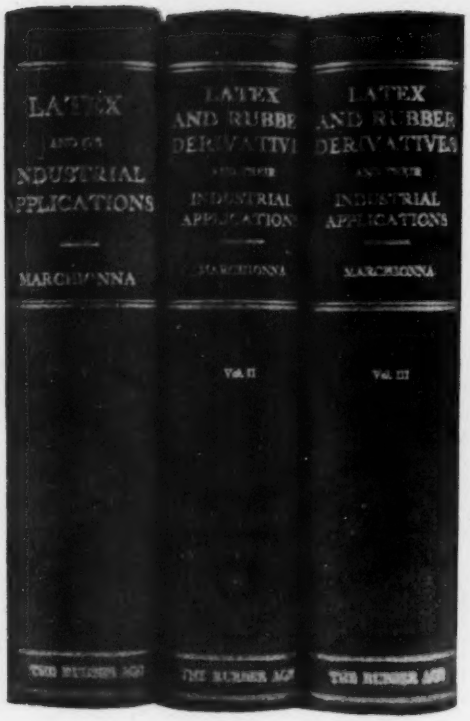

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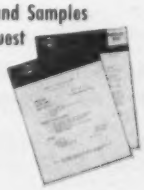

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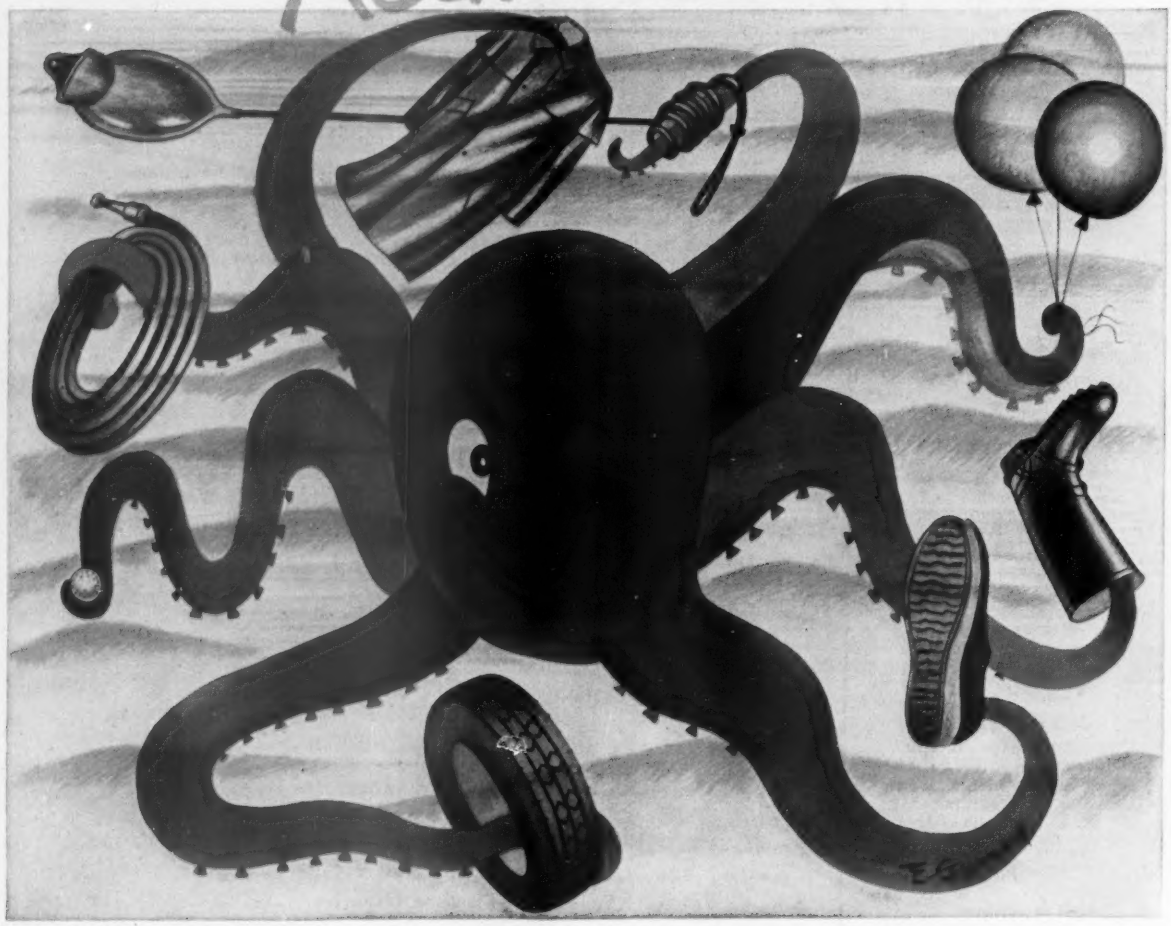

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Vol. 72, No. 4 JANUARY, 1953

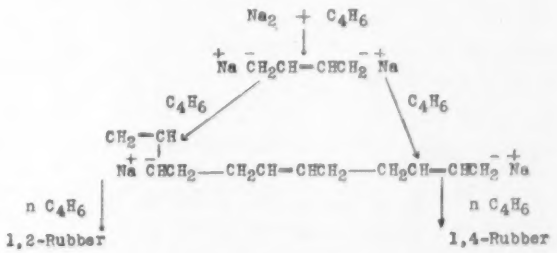
Alfin Rubbers—A New Type of Polymer

By AVERY A. MORTON

Department of Chemistry, Massachusetts Institute of Technology, Cambridge 39, Mass.

THIS paper contains a description of a special catalyst for polymerizing butadiene and mixtures of butadiene and styrene and gives some account of the uniqueness of the polymers which it produces. Emphasis will be put on the chemical side of the work, as befitting an organic chemist who views the rubber problem from the synthesis angle rather than a compounder who must use the material. Nevertheless, the properties of the new rubber which give promise for practical interest will be stressed. The work has been generously supported and encouraged by the agency responsible for the development of the Government Synthetic Rubber Program during and since World War II. This agency has gone under several names but is currently identified as the Office of Synthetic Rubber of the Reconstruction Finance Corporation.

Prior to our work two common types of agents for polymerizing dienes existed. The first was sodium or an alkali metal. The action of such an agent on a diene was discovered independently, in 1911, by Matthews in England and by Harries in Germany. The process was used by Germany during the first World War for the preparation of methyl rubber from 2,3-dimethylbutadiene and has been applied by the Russians to butadiene and to butadiene-styrene mixtures. The method by which sodium probably functions was explained by Ziegler *(16)*, in a series of papers from 1928 to 1934, to be the addition of the metal to the end carbons of the diene to give an organosodium compound followed by chain growth with more diene units in either of two ways to give the polymer or rubber. Growth by the predominating (70%) 1,2-process is illustrated on the left and by a 1,4-process on the right:



This process was largely replaced by emulsion polymerization which was developed by the Germans between the two World Wars. The catalyst in this case is a peroxide, persulfate, azo compound or other material which will decompose and liberate a free radical. For example, benzoyl peroxide, $C_6H_5CO_2—O_2CC_6H_5$, splits

Note: This article is based on a talk given by the author before the Buffalo Rubber Group, March 4, 1952.

to form benzoyl, $C_6H_5CO_2$—, which in turn decomposes to phenyl, C_6H_5—, and carbon dioxide. Either benzoyl or phenyl—called "R" in the succeeding two formulas—can add to butadiene to give the adduct $R—C_4H_6\bullet$ which in turn can add more diene units by a 1,2- or 1,4-process to give the polymer $R(C_4H_6)_nH$. Other reagents behave somewhat similarly. The highest perfection for this type of process is probably reached in the manufacture of cold rubber with a redox reagent, about which so much has been said during the past few years.

In principle the two processes seem to be much the same in that something adds to the diene and each mono adduct in turn can add more diene molecules until a large polymer is formed. There is an important structural difference between the two types, however, in that the polymers made with the aid of sodium are largely (about 70%) 1,2, whereas those made in the emulsion system with a radical are around 70-80% 1,4.

Similarities and Differences

The new process which is about to be described has features that suggest a similarity to the old sodium process, yet the differences between the products are greater than for those found after the sodium and emulsion polymerizations. In the equations below, I have redrawn the formulas for the polymerization by sodium and have set off by dotted lines a segment of the first addition compound—the disodium intermediate—which has a structure identical, save for one hydrogen, with the allyl ion in allylsodium, $CH_2 = CH\bar{C}H_2\overset{+}{N}a$.

$$2\ Na + CH_2{=}CH{-}CH{=}CH_2 \rightarrow \overset{+}{N}a\ \bar{C}H_2{-}CH{=}CH{-}\bar{C}H_2\overset{+}{N}a \quad (1)$$

$$\overset{+}{N}a\ \bar{C}H_2{-}CH{=}CH{-}\bar{C}H_2\ \overset{+}{N}a$$
$$\longleftarrow R \longrightarrow$$
$$+\ C_4H_6 \rightarrow R{-}CH_2{-}\overset{2}{C}H{-}\overset{1}{C}H{=}CH_2 \text{ or}$$
$$\overset{-}{N}\overset{+}{a}$$
$$R{-}\overset{3}{C}H_2{-}CH{=}\overset{4}{C}H{-}\bar{C}H_2\ \overset{+}{N}a \quad (2)$$

$$R\ C_4H_6\bar{N}a^{+} + n\ C_4H_6 \rightarrow R\ (C_4H_6)_{n+1}\ \overset{+}{N}a \quad (3)$$

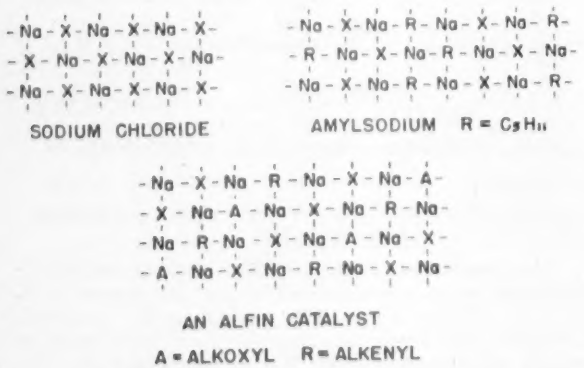
This segment, which is designated as "R," adds to another molecule of butadiene chiefly in the 1,2- way and eventually takes on more diene units to become a rubber molecule. Of course the other end of the initial disodium intermediate is growing also but the structural unit that so resembles the allyl ion is of particular interest for comparing sodium with Alfin polymerization. Indeed we could, if we wish, prepare allylsodium independently by first making a very active organosodium reagent, as illustrated in equation (4), by the prepara-

$$C_5H_{11}Cl + 2\ Na \rightarrow C_5H_{11}\bar{N}a^{+} + NaCl \quad (4)$$

tion of amylsodium—actually any active organosodium reagent, such as phenylsodium or ethylsodium, can be made first—and then allowing the sodium reagent to react with propylene to give allylsodium, as in equation (5). We then can omit the first step in the ordinary

$$C_5H_{11}\bar{N}a^{+} + CH_2{=}CHCH_3 \rightarrow C_5H_{12} + CH_2{=}CH\bar{C}H_2\ \overset{+}{N}a \quad (5)$$

polymerization that employs sodium metal. The remaining steps of adding butadiene units to allylsodium would be essentially the same as depicted for the disodium intermediate and the polymer would have about 70% 1,2- structure.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- A - Na - X - Na - R - Na - X - Na -
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FIG. 1—Nature of organosodium reagents.

TABLE I—EFFECT OF ASSOCIATED SALTS ON THE POLYMERIZATION OF BUTADIENE BY ALLYLSODIUM, $CH_2 = CHCH_2Na$

Allylsodium with	Yield %	Intrin. vis.	1, 2-Addition %
NaCl	4	0.5	53
$NaOCH(CH_3)_2$	4	0.4	47
$NaCl + NaOCH(CH_3)_2$*	65	13.0	28

* This combination is the Alfin catalyst.

The Alfin reagent *(7, 11)* consists of this same allylsodium mixed, however, with sodium isopropoxide and sodium chloride. The name indicates a two component mixture because, when first discovered, only the sodium salt of an alcohol—isopropyl alcohol—and the sodium salt of an olefin—as allylsodium really is—were considered essential. Since that time we have found that common salt *(8)*, NaCl, is as much needed as either of the other two sodium salts. The effect of associated salts on the polymerization of butadiene by allylsodium is shown in Table I. The transition from sodium chloride crystal to Alfin catalyst by replacing theoretically part of the chloride ions, first with amyl, C_5H_{11}, and then with isopropoxyl, $—OCH(CH_3)_2$, and allyl, $—CH_2CH = CH_2$, is shown in Figure 1. A change in crystal structure is not shown in the diagram.

The presence of sodium isopropoxide and sodium chloride on allylsodium is like giving an electric shock to a sleeping animal. The system springs into action and produces a polymer at about the fastest rate known. Moreover it does not stop at any intermediate point but continues at a furious pace until the molecular weight *(1)* (weight average) has reached 7,000,000 or more, over twice the size of natural rubber. In spite of this great size the Alfin polybutadiene can be obtained completely soluble in benzene. No other polymerizing agent can touch such a performance. The average run of a sodium or emulsion polymerization without cross-linking is around 100,000 or 200,000, well below natural rubber.

A comparison of molecular weight distribution for Alfin and cold rubber polybutadiene is shown in Figure 2. The graph shows the similarity in appearance of the molecular weight distribution curve but, because of the great difference in average molecular weight (possibly 20 fold), the scale on the horizontal axis has been magnified ten times for the cold rubber polymer

and has been correspondingly reduced by the same factor on the vertical axis. Nowhere would any portion of the curves appear to overlap appreciably, even if allowance is made for the different basis of molecular weight average. Data for the cold rubber polymer are from Mochel and Nichols [*Ind. Eng. Chem.*, Vol. 43, p. 154 (1951)].

But great speed, huge molecular size, and absence of intermediate steps are not the sole features in this process. The polymer is around 70-80% or more 1,4-, whereas the ordinary polybutadiene made with sodium is largely 1,2- and the X-ray diffraction shows a regular pattern without any special treatment to extract low molecular weight material. A number of other properties could be listed where the catalyst and process are strikingly different but those mentioned are sufficient to set the process and the polymers in a unique class. These differences are, in summary: (1) the composition of the reagent; (2) the enormous speed in polymerization; (3) the inability to stop the process at intermediate points; (4) the extraordinarily high molecular weight without cross-linking; (5) the predominantly 1,4-structure with regular crystalline pattern.

Background of Development

One of the questions usually asked is how we happened to discover this catalyst. For many years the author and his students had been studying the organosodium compounds. We had worked out a method for obtaining amylsodium directly from sodium metal and amyl chloride [equation (4)]. It is probably the most active organosodium reagent known. When this country seemed about to be involved in World War II, we turned our interest to a study of the action of this extremely reactive agent on butadiene. At that time the common view was that only the anion was the agent in organosodium compounds. The cation was regarded as inert and the reagent was classified as nucleophilic, meaning essentially that its reactions were solely those of an anion or base. The equations for an anion process of polymerization, as shown below, simply ignore the possible action of the cation but otherwise seem similar to equations (2) and (3):

$$C_5H_{11}^- + C_4H_6 \rightarrow C_5H_{11}CH_2\bar{C}HCH{=}CH_2 \qquad (6)$$

$$C_5H_{11}CH_2\bar{C}HCH{=}CH_2 + n\ C_4H_6 \rightarrow C_5H_{11}(C_4H_6)_nC_4H_6^- \qquad (7)$$

After about a year of such study, we seemed to be getting nowhere except to show the prospect of some secondary reactions. The polymer itself was essentially the same as obtained in the ordinary polymerization induced by sodium. A review *(6)* of the literature indicated that the cation might have an influence also. We accordingly threw away the rule book, so to speak, and struck out on a new course with experiments designed to affect in some way the cation. Unusual good fortune smiled upon us and the second experiment *(11)* in that series produced the mixture which contained the Alfin catalyst. An account of the cascade of reactions involved in that discovery has been published already *(7)*.

Another question always asked—indeed the first one usually—is what makes it work. For answer we can only indulge in some reasonable guessing. First, we know that these sodium reagents, as used in pentane, are insoluble clusters of ions; hence, the surface is made up of positive and negative centers. To react with this reagent a molecule must first be adsorbed. Thereby it is subjected to all the strains or distortions

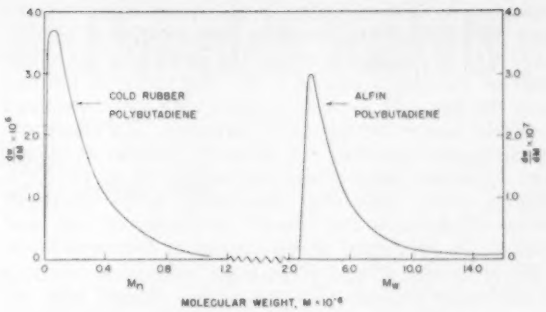

FIG. 2—Comparison of molecular weight distribution for Alfin and cold rubber polybutadiene.

which electric forces can induce. These forces are considerable. Within the aggregate they hold it together, and render it insoluble, non-volatile and non-melting because the coordination number of each cation is four or six. At the surface these forces are unsatisfied and serve to adsorb diene molecules.

We next assume that this surface has a structure that fits the butadiene and activates it. A simple analogy will show this idea better. Picture a large assembly room. Suppose that the seats in this room are cations, that the spaces between them are occupied by tables which are anions, that each occupant of a chair is a molecule of butadiene and that the ends of his arms, extended over the tables, are the end carbons of the butadiene molecule. If the tables are just right and the chairs are the right distance apart, the fingers of one man will touch the fingers of the next man. The right degree of activation or shock will then cause each man to seize the hands of his neighbors and produce an end to end chain or polymer. Each end man of the long chain has one arm dangling which seizes a table to end the process. This ideal condition can be contrasted with one where the distances between chairs are too great or too small, where some chairs are too high or too low, and where some men are seated at right angles to others. The activated hands may grab shoulders instead of hands or seize the tables too soon and too often. Slow polymerization, 1,2-structure and short chains result.

Current Working Hypothesis

This rough analogy gives some idea of the working hypothesis which for the moment guides our thinking. The picture calls for specificity of an unusual degree of which many examples can be cited. For instance, the cation "seat" must be sodium in the allylsodium. The potassium cation can be used only in limited amounts in the other two salts and the lithium ion even less and only under special conditions *(9)*. The three anion "tables" have rather rigid specifications. The organic anion must have a double bond next to the methylene group, an allylic system for which the allyl ion, $CH_2 = CH\bar{C}H_2$, is very suitable. The alkoxide ion is best derived from a secondary alcohol with one branch a methyl group. Isopropyl alcohol, $(CH_3)_2CHOH$, serves nicely. The halide ion *(8)* can be chloride, bromide, iodide, cyanide, thiocyanate, but the small sized fluoride ion can be used only if compensated by a large caesium cation. This balancing of sizes enables us to use the small sized lithium ion, as mentioned before, provided it is associated with the largest halogen ion,

as found in lithium iodide. The proportions of the three salts must sometimes be kept within a narrow range *(13)*. Finally, only certain monomers or occupants of the chairs can be used. Butadiene is far and away the best. It joins faster and with more members per chain than either styrene or isoprene. 2,3-Dimethylbutadiene, the monomer for the methyl rubber of World War I, is not polymerized appreciably if at all *(10)*. Acrylic esters and other monomers with functional groups sit down in the "chairs" in the wrong way and react at the functional group instead of the vinyl bond.

Many details of this picture are necessarily omitted in this brief account but it must be obvious that we appear to have the unique feature of a polymerizing agent that can be directed toward a specific target rather than the usual shot-gun type of agent that is applied so generally. Nor do we now think that this surface activity and specificity is so peculiar or is limited to polymerization. Even the simplest solid organosodium reagents, as found in the time-honored Wurtz reaction or in metalation processes, are affected by the salts associated with the reagent itself. And many alkali metal halide salts *(4, 5)* of the sodium chloride cubic crystal type adsorb dyes on some faces of the crystal and not on others, for all the smooth appearance of the crystals.

Actually, to a molecule, the surfaces of common salt crystals are very rough. The halide ions can be twice as large as the sodium ones. If we could pluck out large numbers of the halide ions and replace some with allyl ions and others with isopropoxide ions to form theoretically an Alfin catalyst, we would have a surface even more irregular but well adapted to the specific task of polymerizing butadiene.

Practical Use of Polymer

We shall now consider those features which will affect the practical use of this new type of polymer. Here I must rely on the work of J. D. D'Ianni, of the Goodyear Tire and Rubber Company, and of W. K. Taft, of the Government Laboratories at Akron.

In general the properties of the Alfin polymers are those which might be expected from the unusually large molecular size. There is great difficulty in breakdown on a mill. Heat alone causes the formation of gel because a small amount of crosslinking in a large molecule has an effect out of proportion to the amount of reaction. The raw Mooney value is outside any reasonable range for either the polybutadienes with intrinsic viscosities which range from 12 to 20 or the 75-25 copolymers with styrene with viscosities from 7 to 13. Styrene reduces the rate of polymerization of butadiene and the intrinsic viscosity of the product and the copolymer is somewhat easier to handle but even then the early tests *(2)* were made only after breakdown of small quantities at a time on a very tight mill. The material was the despair of everyone who handled it.

Subsequently, Mr. Taft blew air *(15)* into the Banbury while the copolymer was being worked and reduced the Mooney viscosity to 100 ML-4 in 13 minutes and to 40 ML-4 in 29 minutes. He tried a number of variations of this treatment and was able to retain many of the unusual properties of polymer.

Another obvious method of handling these products has been the use of solvents or oil diluents *(3, 14)*. The polymer is, of course, obtained in a mass swollen with pentane or other solvent used in the preparation and is softer while in that condition. The addition of any nonvolatile solvent at that point will enable the polymer to remain more workable. The use of oil in this way to give an oil-extended rubber has opened a field of special interest. Polymerization can also be carried out in the presence of oils.

When the material is compounded the tests *(2, 15)* show, in general, superior abrasion resistance, very high flex life, and excellent aging properties. Abrasion efficiency values as high as 156 and 154 have been reported for the copolymer as compared with 100 for GR-S and 120 for cold rubber. DeMattia flex lives as high as 18 and 25 x 10^3 have been found for the copolymer, where GR-S was 4 and the cold rubber was 7. The flex life was retained at a high level after 24 hours aging at 212° F.

The tensile strengths, as a rule, are below those expected for a rubber of such high molecular weight, probably because of the difficulty in proper compounding. The 300% modulus, however, is usually higher than for GR-S or cold rubber but the elongation at break is less.

The polymer has the interesting property of being set or vulcanized by heat without the necessity of incorporating sulfur. Pressure and heat can be used to shape *(2, 14)* and set even the intractible (on the mill) Alfin polybutadiene.

Compounded polybutadiene *(14)* has better low temperature properties and better resistance to aromatic hydrocarbons than Perbunan but the resistance to aliphatic oils is not as good. The 75-25 copolymer is much better than GR-S in these respects and there is reasonable hope for appropriate variations of these properties with copolymers of other proportions.

Conclusion

In general, the technical difficulties in the use of this material are being overcome and the special features which would be expected of a polymer of such unusual molecular dimensions are being realized. This part of the field is one where the author, as an organic chemist, feels less at home than in the problems concerned with the catalyst and the behavior of the sodium reagents, but between the improvements in the polymer itself (the original product was cross-linked and completely insoluble in solvents) and increase in the knowledge of how to handle it, a road to practical use of this new type of polymer appears reasonably sure.

LITERATURE REFERENCES

(1) Cleland, R. L. Unpublished research.
(2) D'Ianni, J. D., Naples, F. J., and Field, J. E., *Ind. Eng. Chem.*, **42**, 95 (1950).
(3) D'Ianni, J. D., and Taft, W. K., *Chem. Eng. News*, **29**, 5058 (1951).
(4) France, W. G., *Colloid Symposium Monograph*, **7**, 59 (1930).
(5) Frondel, C., *Am. Mineral.*, **25**, 91 (1940).
(6) Morton, A. A., *Chemical Reviews*, **35**, 1 (1944).
(7) Morton, A. A., *Ind. Eng. Chem.*, **42**, 1488 (1950).
(8) Morton, A. A., and Bolton, F. H., *Ind. Eng. Chem.*, **44**, 2876 (1952).
(9) Morton, A. A., Cluff, E. F., and Collins, F. W., *Ibid.*
(10) Morton, A. A., and Coombs, R. D. Unpublished research.
(11) Morton, A. A., Magat, E. E., and Letsinger, R. L., *J. Am. Chem. Soc.*, **69**, 950 (1947).
(12) Morton, A. A., and Ramsden, H. E., *J. Am. Chem. Soc.*, **70**, 3132 (1948).
(13) Morton, A. A., Welcher, R. P., Collins, F. W., Penner, S. P., and Coombs, R. D., *J. Am. Chem. Soc.*, **71**, 481 (1949).
(14) Taft, W. K., Private Communications, 1947 seq.
(15) Taft, W. K., and Goldsmith, H., *Ind. Eng. Chem.*, **42**, 2542 (1950).
(16) Ziegler, K., Jacob, L., Wollthan, H., and Wenz, A., *Ann.*, **511**, 64 (1934).

Mechanical Applications of Flowed-In Gaskets

By W. M. RAND, Jr.

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FEW engineers realize that approximately 2000 separate items would be required to renew every gasket in an automobile. Nor is it common knowledge that each end of a tin can contains a thin rubber gasket in the seam to protect the contents. Recent developments, however, have indicated the possibility of sizeable economies in this phase of machinery design and construction, and cost-conscious engineers are becoming more interested in the subject.

Generally, a gasket is cut or molded to the desired shape from material appropriate to the sealing requirements. In today's general practice this gasket is then manually positioned or glued to the part before assembly of the unit. Production speeds are low, labor and scrap material costs are high. Now a new method—the flowed-in gasket principle—offers the same sealing efficiency with substantial savings in labor and materials and increased production speeds.

The flowed-in principle is simple: A liquid synthetic resin or rubber compound is flowed into the gasket channel. The entire part, with gasket applied, is then baked and the compound becomes a solid rubbery gasket. Circular gaskets may be applied, using automatic machinery eliminating many hand operations; irregularly shaped gaskets may also be flowed on using conventional hand spray gun equipment. Although the idea of flowed-in gaskets is not new, its application to industrial gasketing problems has only recently received the close attention of technical people.

Consider the case of a manufacturer of pressure and vacuum gauges, fuel level gauges and other instruments with glass faces. When the glass face and outer retainer ring were crimped or rolled onto the instrument body during final assembly, glass breakage was high; cut gaskets, when used, would fall out of position; there were three separate parts to handle. When flowed-in gasketing was used, the flowed-in compound not only caused the glass and ring to adhere as an integral part, but permitted positive sealing and substantial reduction of breakage because the flowed-in gasket was properly positioned in each face assembly.

In another industrial application, an expensive neoprene gasket manually applied to an automobile air cleaner was replaced by an equally resistant compound flowed-in by machine. Economies in labor alone were sufficient to justify the changeover. Still another example: Use of flowed-in compounds by a prominent meter manufacturer resulted in savings which permitted amortization of the necessary application machinery in three months.

While there are many advantages, quite naturally, flowed-in gaskets also have their limitations. They are not resistant to the same high temperatures as are asbestos materials. Nor is it feasible to apply gaskets of much less than ¾ths of an inch in diameter. Frequently the high quality of a rubber gasket is not practical economically. In general, however, the low cost of the flowed-in materials, the labor savings through machine applications, and the good adhesion and sealing properties these gaskets provide make them important in many industrial applications.

Note: This paper was presented before the Rubber and Plastics Division, American Society of Mechanical Engineers, New York, December 4, 1952.

Flowed-In Gasket Materials

What are the requirements, then, of a flowed-in compound? What materials meet these requirements? How are the compounds applied and how are they baked to form the gasket?

Materials for low pressure nozzle application as gaskets must meet three general requirements:

1. They must be stable liquids with low viscosity and relatively high thixotropy (i.e., they flow only after a certain minimum force is applied).
2. They must be convertible to solid or sponge films of desired thickness by simple and controllable means in a short time.
3. As films, the gaskets must have a wide range of resistance to the effects of temperature, pressure, liquids, and gasses for the required period of time.

Liquid materials that fill these requirements are:

1. Vinyl plastisols and organosols.
2. High solids solvent solutions of the various oil-resistant synthetic rubbers.
3. High solids water dispersions of natural or synthetic rubber.

The plastisol and organosol compounds are especially adaptable as industrial flowed-in compounds because a wide range of viscosity is possible. The low viscosity materials (1000 cps.) will reflow under heat just prior to gellation, giving smooth, level gaskets. High viscosity compounds (up to 50,000 cps) can be made to stay put as applied where other compounds might run or slump, and short baking times are possible. One user, for example, applies a circular gasket to a small metal automotive fitting and bakes the liquid gasket instantaneously with a high frequency induction coil. The entire gasketing operation of lining and baking is performed on a single machine in about six square feet of floor space. Generally, for gaskets up to six inches in diameter, one to two minutes at 350° F. is required, depending on the amount of material and mass of the part to which the gasket is applied.

The characteristics of plastisol gaskets are generally known. Moisture transmission through the film is very low; resistance to aqueous liquids, many oils, atmospheric conditions, pressure, and vacuum is good. The film is tough, semi-elastic, and pliable. Low degree of solvent resistance can be improved by over-painting with solvent resistant paints. Solid or cellular gaskets are possible.

The moisture resistance properties made these compounds especially adaptable as gasket material for aluminum container covers for 35 mm. photographic film. The covers pass from the forming and degreasing equipment through an automatic compound application machine and short conduction oven at a rate of 80 per minute. The caps are then ready for painting and final application to the containers.

Four major improvements over the use of precut

TABLE I—CHARACTERISTICS OF FLOWED-IN SEALING COMPOUNDS

	Plastisols	Solvent Compounds	Water Dispersions
Total Solids (%)	100	50-90	70-85
Viscosity (cps.)	500-40,000	1000-500,000	1000-100,000
Specific Gravity of Solid Film	1.3-2.0	1.5-2.0	1.2-2.0
Application Temperature	110-120° F.	Room Temp.	Room Temp.
Application Method	Hyd. Pressure	Hyd. Pressure	Air Pressure
Unsupported Film Thickness (Max.)	.075"	.050"	.100"
Average Baking Schedule	1 Min./350° F.	120 Min./325° F.	90 Min./210° F.
Adhesion to Untreated Metal	Fair	Good	Good
Oil and Solvent Resistance	Fair-Poor	Good	Fair
Effective Temperature Range	0° F.-200° F.	—45° F.-300° F.	—45° F.-250° F.

gaskets have resulted: (1) Gaskets do not fall out during hopper handling of caps; (2) Eccentric gasket application and consequent leakage are eliminated; (3) Improved moisture transfer resistance, and (4) Increased production speed.

The second group of flowed-in materials, high solids solvent solutions of such polymers as neoprene, Buna N and Thiokol, are especially effective where a high degree of solvent resistance is required.

The film is ordinarily formed by a dual drying-baking operation. The drying phase drives off the solvent and generally requires an hour and a half. The baking cycle of approximately an hour at 325° F. cures the film for the added solvent resistance necessary. This relatively slow speed drying-baking cycle necessitates baking the gasketed parts on trays for full efficiency. Some of these compounds may be baked in as little as thirty minutes. The excellent adhesion of these materials to most metal surfaces makes them especially adaptable where considerable handling of the gasketed part is involved. Low to medium viscosity compounds make varied positioning of the gasket possible.

One interesting application of this type of material is in the manufacture of automotive shock absorbers. Circular welding of the one-and-a-half-inch diameter cap for a shock absorber cylinder, an operation very difficult to control, has been eliminated. This cap is now lined with an annular gasket of solvent neoprene compound near its circumference; caps with compound applied are baked for sixty minutes at 325° F. in a gas fired oven. The finished part is then crimped to the cylinder in a simple rolling operation in which the top edge of the cylinder is forced over onto the gasket to form the seal. Production has been increased, but the greatest advantage in this new application has been the substantial reduction of leaky cylinders.

The third group of flowed-in compounds was listed as high solids water dispersions of natural or synthetic latices. Starting from neoprene, GR-S, or natural rubber latex with a solids content in the range of 30 to 65%, compounds may be formulated up to 85% total solids. Once again, high total solids make possible short drying times and thick gaskets when the films are dried. As liquid compounds, these materials have good storage stability since activators, if required, may be added where necessary just prior to use.

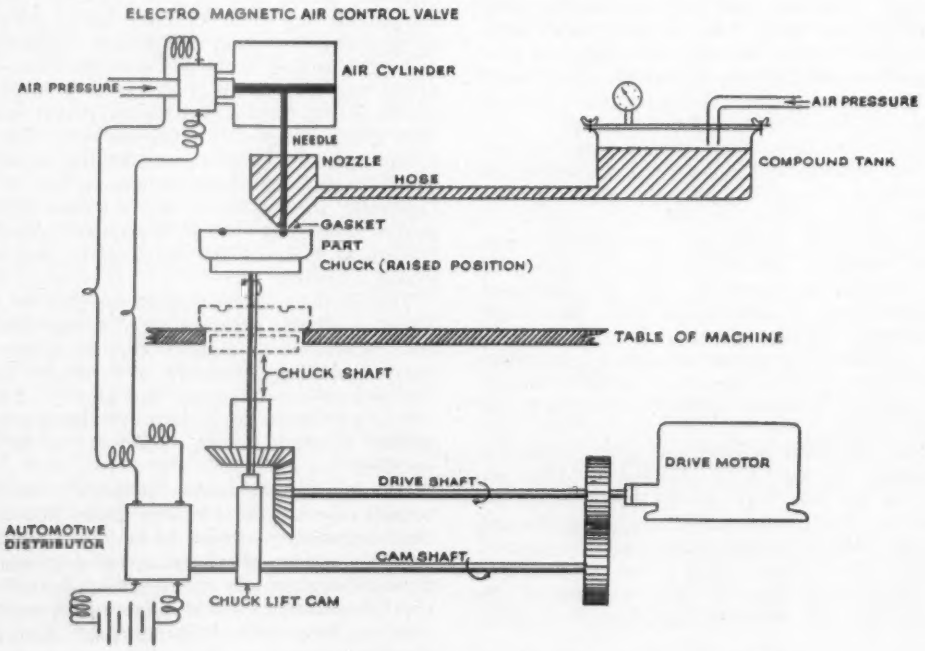


FIG. 1—Schematic diagram of flowed-in gasket application machine.

Drying of these water-base compounds to solid or sponge films requires from ten minutes to two hours. Gas fired ovens with recirculating air temperatures of about 200° F. or less have proven most satisfactory. The resulting film is softer than the two types previously considered and, like the others, may be designed with a slight wax surface bloom. It has good moisture vapor resistance and is specifically applicable where a gasket for protection against vibration or shock is required. The film with the widest industrial application in this group is the puffed or cellular sponge, though solid film gaskets in metal screw caps have been used in the food packing industry for years. By incorporating small stable air bubbles in the liquid compound prior to baking, a sponge is formed when the compound is gelled in the elevated temperature of the oven. One of these puffed compounds is used as a weather- and vibration-resistant gasket on small plugs and lamp sockets used in the automotive industry. Table I reviews the principal characteristics of the three groups of compounds discussed.

Flowed-In Gasket Application

With an intimate knowledge of turbulent and laminar flow and of viscosity, dilatancy and thixotropy, the colloidal chemist can adjust the compounds discussed here so that they may be accurately controlled in their flow properties. But the engineer is equally important in the application of flowed-in gaskets since the mechanics of the nozzle and its controlling mechanism determine the accuracy of both film weight and gasket placement.

Where tolerances of weight and position of the gasket are not stringent and production rates slow, hand appliances may be used, such as paint sprayers or grease guns. The liquid gasket is squirted into place as desired and the gasketed part then placed in a suitable oven for baking of the compound to a rubbery film. The area requiring a gasket may even be dipped in the compound and then baked. Where a circular gasket and higher production speeds are called for, however, semi-automatic or automatic equipment is required. Such equipment has been in use for many years in the can manufacturing and metal screw cap industries for application of sealing compounds to metal caps for glass jars and to the ends of tin cans prior to can assembly.

The principle of machine application is simple: the part to be lined is placed manually or automatically on a table over a spinning chuck, the chuck rises through a hole in the table carrying the spinning part up under the tip of a mechanically, pneumatically or electro-pneumatically controlled nozzle. The nozzle, being timed with the spinning of the part, is then opened so that a controlled amount of compound flows into place. A circular deposit results since the nozzle is stationary and the part is spinning beneath it on a concentric shaft. When the lining is complete (after one, two or three revolutions), the chuck of the lining machine then drops to its initial position below the table level and the lined part may be removed by hand or by a take-off device automatically in time with the rise and fall of the chuck. Figure 1 schematically describes the essentials of the application. As is seen from the diagram, four principal mechanisms are involved:

1. The nozzle and its control.
2. The chuck drive and chuck lift mechanism.
3. The compound supply system.
4. The mechanism for supplying and removing parts automatically. (Not shown).

There are many possible variations to nozzle mechanism design. For instance, a direct mechanical linkage for opening and closing the nozzle is possible, operating directly from a cam on the cam shaft. Can end lining

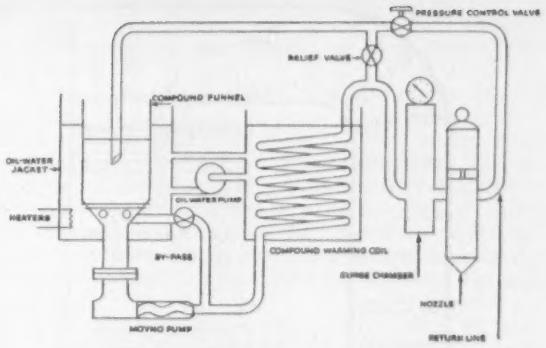


FIG. 2—Schematic diagram of controlled temperature compound pumping unit.

machine nozzles operate in this fashion at speeds in excess of 300 units per minute. If linkage is kept to a minimum, this system works very well. Excessive linkage generally results in lost motion and loss of control. Accurate one or two-revolution linings are thus difficult; and film weights, hence gasket dimensions, will vary.

An air plunger actuating a simple needle lifting lever may be used for opening the nozzle. This air plunger, in turn, is operated by an air control valve driven directly off a lining cam on the cam shaft. This system works well where high lining speeds are not required. It is apparent, however, that there will be an undesirable air cushion effect if the air line from the air control valve to the nozzle opening plunger is long.

Perhaps the best mechanism for nozzle control is the one shown in the diagram. A standard adjustable automobile distributor is driven by the cam shaft of the machine. Electrical impulses from the distributor are relayed to an electro-magnetic air valve which directs high pressure air above or below a small piston. The piston rod is directly connected to the nozzle needle so that very fast and positive opening and closing of the nozzle is possible. An electro-pneumatic nozzle such as this may operate at 600 strokes a minute. On machines operating commercially at speeds of 150 parts per minute, film weight control with this nozzle has been maintained within 5%. It has been found necessary to use direct current for the best operation of this nozzle mechanism at speeds above 50 per minute in order to avoid the slight lag encountered when the distributor makes contact at the same moment the alternating current charge may be changing sign.

The second essential of the lining machine as listed above is the main drive and chuck lift mechanism. Though this may be primarily a simple gear system, it is worth noting that good control of the rotational speed of the chuck is desirable since the chuck speed, in turn, controls the centrifugal force exerted on the deposited compound once it has been applied. Chuck speeds for the compounds discussed may range anywhere from 200 to 2000 rpm.

When a simple, flat gasket is desired, for example, a low chuck speed will apply, since, as was described earlier, the best flat gasket will be laid down from a low viscosity compound. A low chuck speed will not throw a low viscosity compound off the spinning part. Refinements to the machine are possible where necessary, such as magnetic inserts in the chuck for better traction on light steel parts or chucks and chuck shafts modified for use with plastic, aluminum, paper or wooden parts by use of a hollow shaft attached to a small vacuum pump.

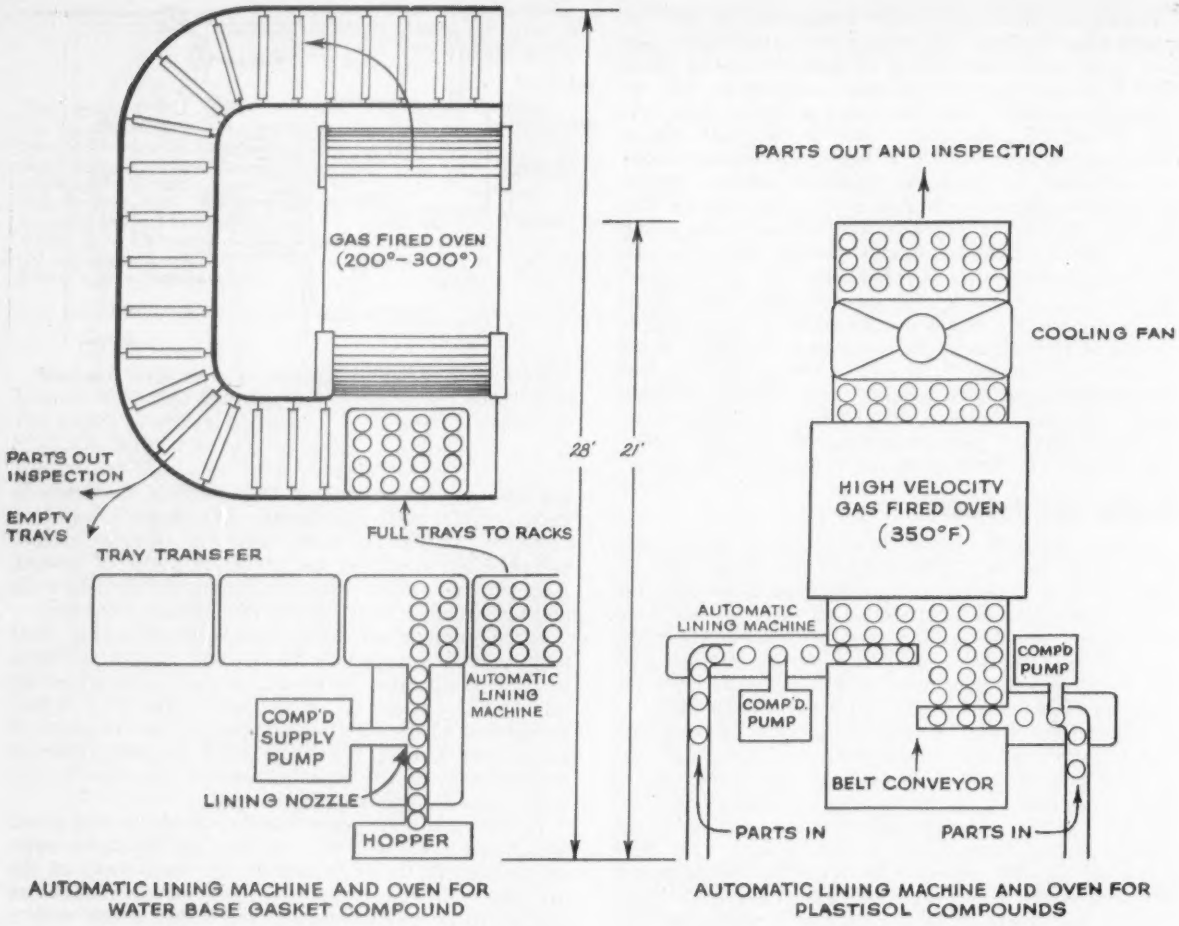


FIG. 3—Two typical flowed-in compound application units.

A system for supply of compound to the nozzle, the third essential mechanism of the lining machine, may be quite simple, as shown in the diagram, i.e., air pressure forces the compound to a dead-end nozzle. Where close control of temperature is required for control of viscosity, or where high pressures are necessary to move high viscosity materials, other methods of supply are more practical.

In the first case, a controlled temperature recirculating pumping unit is generally used for the plastisol compounds previously discussed. Compound is heated in a reservoir and recirculated by pump. The warm compound passes through the tip of the nozzle at a flow rate of roughly five times that required for lining. This flow-through principle keeps the nozzle tip warm without auxiliary heating equipment and also prevents a large pressure drop when the nozzle opens.

Since all colloidal fluids suitable for flowed-in gaskets vary in viscosity with temperature, and since viscosity determines the flow rate through a nozzle at a given pressure, it is desirable to control the temperature of application. Temperature control within two degrees is possible and pressures ranging from twenty to ninety pounds p.s.i. may be developed. A schematic drawing of the pumping unit is shown in Figure 2.

One additional method of supplying compound to the nozzle is the conventional air-motor positive displacement pump such as is used for pressure lubrication of automobiles. With a low pressure air supply, a high pressure compound supply is possible. This piston-type pump is best used in supplying material to a dead-end system as initially described, since a relatively large supply of air otherwise would be required. For dead end supply of high viscosity solvent-neoprene, which would otherwise be unlinable, this pump has proven very useful.

The fourth element of the lining machine was described as the mechanism for supplying the parts to the chuck and then removing them for drying or baking. Since there are as many devices as there are different parts being lined, no further description is necessary than to say that dial feed, reciprocating slide bars, air jets, conveyors of all types and star wheels mounted in any number of ways to the base or table of the machine are in use today and mention of them should serve to start the mechanical imagination working.

One important feature of an automatic machine must not be overlooked, however. It will be apparent that a timing device will be necessary to prevent flowing of compound from the nozzle should there be an interruption in the supply of the parts to the chuck. This may be accomplished by placing a small detector micro-switch in the feed mechanism to break the electrical system to the nozzle operating distributor when steady feed of parts is interrupted. In the case of the other types of nozzle mechanisms, electric solenoids may be actuated

by an interruption of parts supply, and the solenoid, in turn, may be utilized to interrupt the nozzle linkage preventing opening of the nozzle.

Baking the Applied Gasket

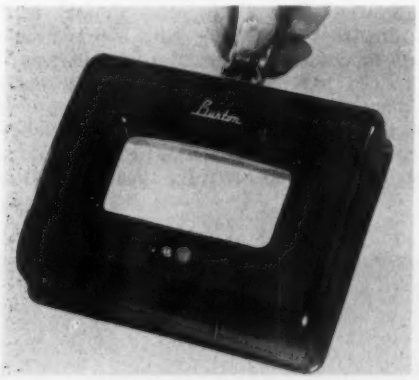
Once applied, compounds may be baked or dried in any number of ways. In the case of the third group of compounds, the water dispersions, a simple drying takes place, so that an oven with recirculating air heated by gas or electricity will meet the requirements. Since the drying may take up to 90 minutes, it becomes necessary to place the parts on trays or in stacks and pass the trays or stacks through the oven in racks. Recently, some water-based dispersion compounds have been developed that will dry in ten minutes; for these, ovens have been built to permit dropping of the lined parts directly from the liner onto the conveyor of the oven in which they are baked, thus eliminating the labor necessary in tray stacking. Ovens of this sort apply naturally to the plastisol compounds where very short baking times are involved. Other baking methods using high frequency induction heating and conduction have already been mentioned.

As mentioned previously in one application, the compound is initially gelled to prevent flow by placing the lined part in a small oven at 350° F. for a moment. The part then goes through a regular paint spray operation and on into the paint baking oven where both compound and paint are baked at the same time. Figure 3 shows two typical installations for the application of flowed-in gaskets. One is designed for a solvent neoprene or water dispersion compound and the other for a plastisol compound.

As we have seen, gaskets are widely used in all phases and types of manufacturing and their handling in assembly has posed many problems. Any method by which this handling is simplified and mechanized certainly should be welcome to the engineer in his constant search for ways and means to cut production costs.

Black Light Magnifier Unit

A compact and powerful black light unit with triple power magnifier has been introduced by the Burton Manufacturing Co., 11201 West Pico Blvd., Los Angeles 64, Calif. Known as Model 1931, the housing measures only 7 x 5 x 2 inches, with the wide view magnifier in the center. Twin tubes, backed by a spectral aluminum reflector, are said to deliver full filtered

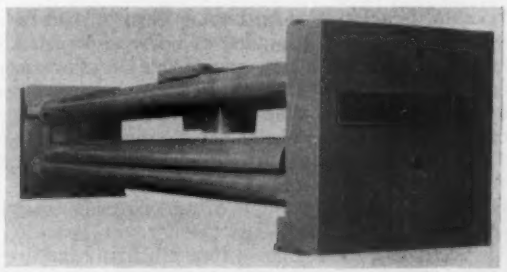


3660 Angstrom long wave ultra violet. New fluorescent tracer media, used with the unit, are said to greatly extend the usefulness of light. These tracers may be added to practically any compounds, either of the soluble or very fine crystalline types.

Efficiency of bonding materials, for example, can be evaluated by examination of cut sections under black light, when tracers have been added to the bonding medium. In multi-layer operations, alternate coatings or layers of material can be made fluorescent without affecting their quality. Coverage can be instantly checked by the fluorescence or non-fluorescence of the surface under inspection. Location of leaks in rubber or rubber fabric items is possible by the addition of minute amounts of colorless fluorescent dyes to water or other fluids, the leaks being revealed in glowing clarity. Coding or identification of test batches or products may be made by using invisible tracers or dye marking media.

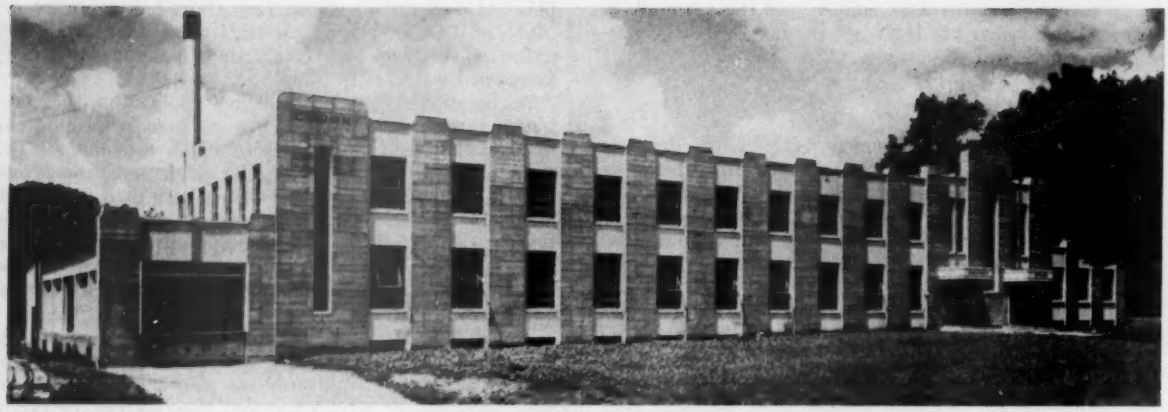
New Accu-Ray Beta Gauge Mounting

A new enclosed-bracket mounting for economically bringing the advantages of beta gauge measurement to industries producing wide sheet material has been announced by Industrial Nucleonics Corporation, Columbus, Ohio. Another addition to the line of AccuRay beta gauge mountings, the new model is designed for use in such industries as paper, plastics, and floor tile where large sheet widths are not uncommon and "crowded" production lines are the rule. A basic feature of the



mounting is the design which permits the source of radiation and detector unit to travel back and forth across sheet on separate arms and never vary their alignment, permitting the same high degree of accuracy provided by other AccuRay models.

Fabricated of welded steel tubing and plates, this standard mounting has been built to handle sheet widths up to 100 inches. An outstanding advantage of the AccuRay unit is its compactness which permits it to be installed without costly alterations in "jammed" production lines. The gauge can be installed at various angles to fit slanting pass lines of material. Company officials state that no change has been made in the AccuRay's measuring system which utilizes beta rays to give a direct reading of basis weight or thickness with extreme accuracy. The non-contacting AccuRay features its unique standardization cycle, which every 30 minutes automatically corrects for change in plant operating conditions including temperature, humidity, and dust collection on source window



View of the Crown Products Co. plant in Ralston, Nebraska, which utilizes some 170 electric motors.

Crown Products Picks Motors to Match Jobs

The average rubber factory uses special process equipment with varied power requirements. The selection of motors to operate such equipment must be given careful thought and consideration since power costs play an important part in profitable operations. How the Crown Products Co. of Ralston, Nebraska, selected motors to meet individual needs is told in the following article, based on information supplied by Fairbanks, Morse & Co., manufacturers of electric motors, Chicago, Illinois.—Editor.

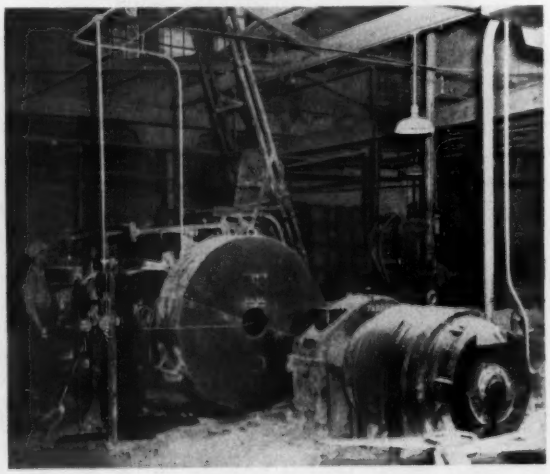
THERE is a lot more to buying electric motors than choosing the right number of horsepower for a job. The industrial user can pick from a wide variety of mechanical constructions and electrical characteristics to get the particular motor best suited to his special requirements. Moreover, the choice usually can be made within the broad standard lines of the major motor manufacturers without the expense of special engineering and fabrication. A good example of effective engineering in selection of standard electric motors is provided by Crown Products Company, prominent manufacturer of rubber products.

At its plant in Ralston, Nebraska, an industrial village ten miles southwest of Omaha, Crown uses 170 motors ranging in size from ⅛-hp. to 300-hp. There are eight units rated 50 hp. or more and the total rating for all units adds up to 1,300 hp.

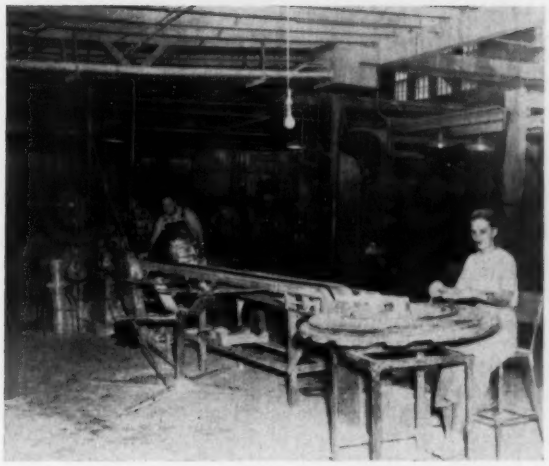
In a single 8-hour shift, this plant can turn out 25,000 feet of wrapped hose, 50,000 feet of extruded bands, 4,000 individual V-type belts. There are fan belts for all standard passenger cars, trucks and tractors; there is hose for auto radiators, air compressors and welding equipment in addition to water hose; there are molded products such as gaskets, grommets, suction cups and washers.

To turn out these products in this volume, the plant utilizes Banbury mixers, rubber mills, calenders, tubers, presses, knitters, braiders, hose wrappers, belt building machines, flipping machines, bias cutters and other equipment. Some of this is standard equipment, common to the rubber industry; some is special equipment designed and built by Crown's ingenious development engineer and production manager, D. G. Jefferson.

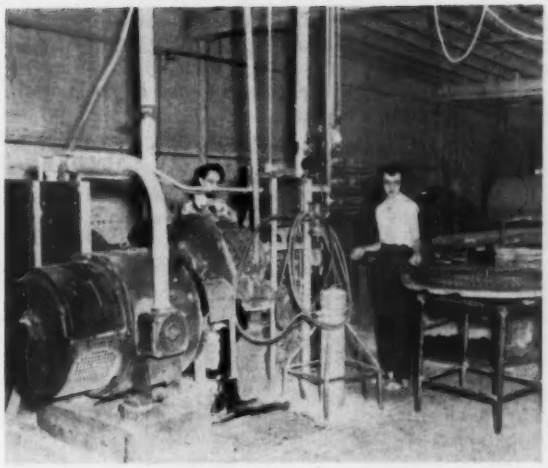
In selecting electric motors to drive this varied machinery, Crown Products engineers first sought to standardize insofar as practicable on a type and make of motor best suited to the general operating conditions. A lot of water is used around the plant and talcum powder is found everywhere to keep rubber from sticking. Also, it was desired to use heavy-duty motors which could operate on a heavy schedule with a minimum of shutdown for maintenance. Standardization was intended, too, to reduce spare parts inventories. The vast majority of the plant's motors are Fairbanks-Morse units which feature drip-proof construction that excludes falling particles and dripping liquids. The F-M motors all have ball bearings sealed in cartridge-type housings which re-



This 60-inch Farrel-Birmingham rubber mill is turned through F-B gears by a 125-hp. Type TZK Fairbanks-Morse synchronous motor. This motor insures against speed variation or slippage and also improves plant power factor.



Rubber tube is extruded by this tuber which is driven by a 30-hp. Type DM Fairbanks-Morse d.c. motor with speed range from 400 r.p.m. with 20 intermediate steps. Speed must be regulated to suit the material and product being extruded.



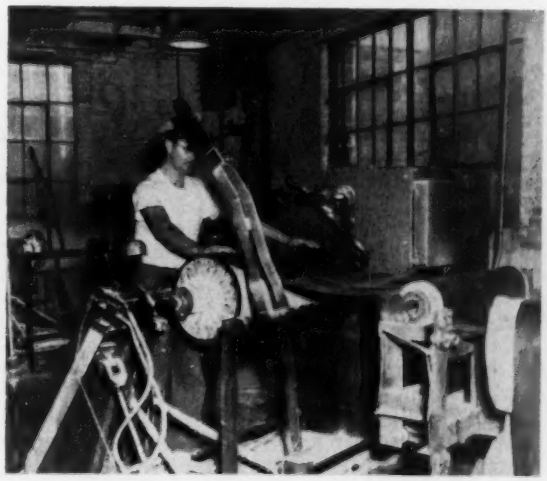
A 25-hp. d.c. 400-1200 r.p.m. variable speed motor drives this side delivery extruder for covering knitted and braided hose. The extruder also is equipped with a straight-through head for producing tubing and washing machine bands.

quire lubrication just once a year for one-shift operation.

Having standardized on some important general characteristics, Crown concentrated on the specific power requirements of each machine, selecting from the standard Fairbanks-Morse line the motors best suited to each application. First step in production of rubber products is the blending of ingredients in a big Banbury mixer. This Farrel-Birmingham machine is driven through Falk gears by a two-speed, Type QXZK Fairbanks-Morse squirrel cage induction motor. Normally, the motor is run at 450 r.p.m. at which speed it delivers 150 hp. When production demand requires it, however, the motor speed can be stepped up to 900 r.p.m. giving the unit a rating of 300 hp. This constant-torque motor can be started across the line at full voltage with comparatively low starting current.

Every 3 to 5 minutes, the Banbury bucket dumps a batch of material into a 36-inch Farrel-Birmingham rubber mill which is turned through F-B gears by a 125-hp. Type TZK Fairbanks-Morse synchronous motor which turns steadily at 600 r.p.m. The requirement in this service is for constant speed with no variation or slippage. A standard induction motor would slow down when a batch of material hit the rolls, but the synchronous motor is unaffected by sharp variations in load.

Slabs of rubber from the mill are put in a cooler and then fed to a tuber which extrudes radiator hose, washer hose, gasket stock and other products ranging in diameter from 7/16-inch to 5 inches. The differences in diameter, wall thickness and viscosity of material necessitate variation in speed of operation. In working material of high viscosity, the tuber must run at relatively low speed. To provide the flexibility of speed con-



Space was the big factor in choosing a motor for this belt-building machine since it had to be placed inside the housing. Consequently, the engineers picked a 7½-hp. F-B axial air gap motor.

The bias-cutter is a stop-and-start machine and the motor chosen for it is a 3-hp. 1120 r.p.m. Type QV Fairbanks-Morse slip ring induction motor which has high starting torque and low starting current.

trol essential for this machine, Crown selected a 30-hp. Type DM Fairbanks-Morse d.c. motor with speed range from 400 r.p.m. to 1200 r.p.m. with 20 intermediate steps. A d.c. motor was chosen because it lends itself best to variable speed service.

For sheet production, there is a 36-inch tandem mill turned through D. O. James gears by a 150-hp. Type TZO Fairbanks-Morse synchronous motor. The material then goes to an Allen calender driven by a 100-hp. two-speed motor through Falk gears.

Where suitable, the company uses standard motors. Thus, on the hose wrapping machine designed by Mr. Jefferson, the motor is a Type QZK squirrel cage induction motor rated at 10-hp. at 1800 r.p.m. This F-M unit drives the machine through reduction gears.

On some special machines, however, the standard type motor just doesn't fit. When Mr. Jefferson designed the belt building machine with its variable diameter drum for making automobile fan belts of various sizes, he encountered serious space limitations for the electric motor inside the machine housing. Consequently, he used a 7½-hp. Type QZAK Fairbanks-Morse axial air gap motor which occupies only about a third the space of a conventional type motor of equal capacity.

In the case of the cement mixer, petro benzol and lacquer fumes create a fire and blast hazard so the 5-hp. motor is of the explosion-proof type and, as an added precaution, is physically separated from the mixer by a wall.

Synchronous motors are used where possible to improve the load factor of the plant. This improves voltage control, increases distribution and transformer capacity, and results in lower costs through a power factor clause in the power contract. With a 125-hp. motor at unit p.f. and a 150-hp. motor with a leading 80 percent power factor, the p.f. for the entire plant is a good 95 percent.

Purchased power comes to the plant at 440 volts and is distributed from a central motor control panel at 440, 220 and 110 volts. A 75-kw. motor-generator set provides d.c. current at 230 and 115 volts.

The most important consideration in motor operation, from Crown's point of view, is dependability and continuity of service. The failure of the motor running a tuber, for example, would cause the rubber to "freeze" in the machine and result in a costly delay before the tuber could be returned to production. Thus, the best evidence of the success of the company's motor policy is the fact that the plant has experienced only one motor failure and that occurred nine years ago.

Crown's progressive management is headed by President G. B. Williams with G. H. Williams as vice-president and N. K. Kennedy as secretary. W. A. Frey serves as general manager and D. G. Jefferson as production manager.

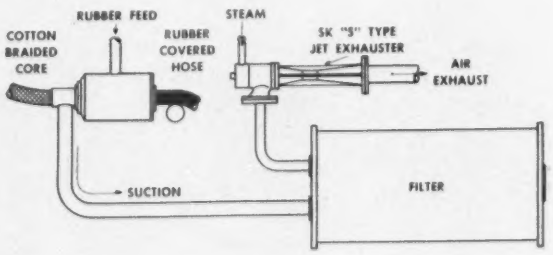
Jet Exhauster Cracks Rubber Hose Production Problem

ENGINEERS at the Trenton, N. J., plant of the Thermoid Rubber Co. recently met and mastered a difficult production problem by applying the principle of the jet to the manufacture of rubber hose. The following data on the problem and its solution is based on material furnished by the Schutte and Koerting Co., Cornwells Heights, Bucks County, Penna., manufacturers of varied industrial equipment.

The problem was this. During a key phase of the production operation the hose tube, which is covered with a reinforcement, is coated with rubber in a plastic state. This process takes place in a machine where a powerful suction must be employed to draw the rubber down, around, and against the reinforcement. The suction has to be consistently strong enough to insure that the rubber will be applied tightly and uniformly around the core, in order to guard against looseness which might result in processing difficulties and unsightly surface defects. In addition, the suction must be strong enough to pull off any foreign substance or particles from the braided material which could otherwise prevent uniform adhesion between the braid and the rubber. Since hose is produced and sold in lengths of hundreds of feet, any weaknesses or unsightly defects can cause comsiderable loss in rejects.

Thermoid engineers solved the problem with an SK Type "S" Jet Exhauster. To the part of the unit where the rubber is drawn in, around, and against the core, they attached a rubber hose. This hose was connected to two filters and was then connected to the suction connection of the exhauster. Steam, entering the exhauster through the pressure inlet, issues through an expanding nozzle in the exhauster at high velocity, entrains air from the inside of the hose making unit, and discharges to atmosphere. Operating at a vacuum reading of 24"-26" Hg., the exhauster maintains a consistently strong suction—sufficient to cause the rubber to be drawn into the unit and tightly and uniformly applied around the core.

Thermoid engineers report that the highly satisfactory performance of the Jet Exhauster has practically eliminated production problems during this phase of the operation. Further, the exhauster has displayed great superiority over the mechanical vacuum apparatus formerly used in this operation. Whereas the previous equipment required constant maintenance in order to insure proper operation, the SK Type "S" Jet Exhauster requires practically no maintenance.



The phase of the hose making process in which Thermoid engineers applied an SK Type "S" Jet Exhauster to create required suction is shown in this diagram.

Engineering Developments of Rubber: 1951-52

By BETTY JO CLINEBELL

Librarian, Rubber Division Library, University of Akron, Akron, Ohio

and LEORA E. STRAKA

Research Librarian, Goodyear Tire & Rubber Co., Akron, Ohio

DURING the past year, the National Production Authority removed most of the government controls on the acquisition and consumption of rubber. Effective January 1, 1952, the National Production Authority, in its revision of Rubber Order M-2, authorized the unlimited use of synthetic rubber, but the limits on the amount of natural rubber used in products were kept in effect *(1)*. In April, 1952, in another revision of Rubber Order M-2, the National Production Authority removed all but a few minor restrictions on the use of natural rubber. This order also made provisions to prevent a decrease in the consumption of synthetic rubber due to uncontrolled natural rubber usage. Also, the Reconstruction Finance Corporation was directed to build up a government stockpile of GR-S rubber of at least 75,000 tons. Effective July 1, 1952, private industry resumed the buying of natural rubber latex. This had previously been done by the government's General Services Administration *(2)*. In March, 1952, the thirteen-months-old ban on white sidewall passenger tires was lifted *(3)*.

In June, 1952, the Rubber Act of 1948 (Public Law 469, Eightieth Congress) was extended for twenty-one months, to March 31, 1954. In preparation for the expiration of this act, the Reconstruction Finance Corporation is developing a detailed disposal program for returning government-owned synthetic plants to private industry. This program is to be presented to the President and Congress by March 1, 1953, and the President is required to put this program in the form of legislative recommendations to Congress by April 15, 1953 *(4)*. It has been announced that an engineering appraisal of government-owned synthetic plants will be undertaken as part of the disposal program *(5)*. According to the President's Materials Policy Commission Report on Rubber, the declared United States Government policy is "that the security interests of the United States can and will best be served by the development within the United States of a free competitive synthetic rubber industry" *(6)*.

The production of synthetic rubber is at its highest in history: 843,000 tons per year. All of the 28 government-owned synthetic rubber plants have been reactivated. One-third of the synthetic rubber now produced is cold rubber. It is predicted that by the end of 1952 75% of all synthetic rubber produced will be cold rubber *(7)*. Restrictions on the purchase of government-produced cold synthetic rubber were removed in an Amendment to Order M-2, dated August 29, 1952 *(8)*. It has been estimated that cold rubber has saved 700 million dollars in increased tire mileage in the five years it has been available—more than the cost of building the entire United States synthetic plant system *(9)*. In January, 1952, government-owned synthetic plants were producing between 3100 and 3600 tons a month of oil-extended rubber, and higher production was being discussed *(10)*. The consumption of GR-S latex increased in 1951, as compared with a drop in the consumption of natural rubber latex *(11, 12)*.

It has been predicted that by 1955 the demand for new rubber may be 150,000 tons in excess of the world's present total capacity, and that by 1960 the demand will be 1,500,000 tons in excess of the present potential capacity *(13)*. According to the President's Materials Policy Commission Report, the consumption of rubber may double by 1975, and since natural rubber production is not expected to increase by more than 35%, this increased consumption will necessarily be synthetic rubber *(14)*.

The price of natural rubber has fallen from 66c a pound in June, 1951 *(15)* to 39c a pound in May, 1952 *(16)*. The price of natural rubber for the first half of 1952 averaged 37.8c a pound as compared with 64.7c a pound for the first half of 1951 *(17)*. The price of synthetic rubber ranged from 24.5c a pound in August, 1951 *(18)* to 26c a pound in September, 1951 *(19)*, and to 23c a pound in March, 1952 *(20)*. Although the price of petroleum butadiene was raised from 13c a pound to 18c a pound on September 1, 1952, it is expected that the price of GR-S will remain at 23c a pound for at least the next several months *(21)*.

In an effort to stimulate crude rubber production in Central and South America, over a period of years the government has helped to establish rubber tree plantations in 14 countries extending from Mexico through Brazil. There are now 35,000 acres of tree rubber under cultivation in Central and South America *(22)*. A supply of rubber in the Western Hemisphere would lessen the peril of being cut off from our source of supply in the Far East, and also, a rubber growing program should bring about an economic improvement in the Western Hemisphere. As proof that the idea is practical, rubber has been grown successfully and economically in Costa Rica for the past 15 years *(23)*. Rubber growing in Africa, which has been carried on since the beginning of the century, is steadily increasing, although the rubber produced is only a small percentage of the total world production *(24)*.

Synthetic Rubber Developments

Cold Rubber: The advantages of cold synthetic rubber polymerized at 5° C. over standard GR-S polymerized at 50° C. are well established. However, continuous studies in this field have shown that polymerizations carried out at a series of temperatures, ranging from —18° C. to 50° C, give products which vary as a function of the temperature and molecular weight. For instance, it has been shown that there is an improvement in stress-strain and resilience as the polymerization tem-

Note: This report was presented before the Rubber and Plastics Division of the American Society of Mechanical Engineers, New York, December 4, 1952.

perature is reduced from 50° C. to 5° C.; this improvement was much greater than that resulting from further reduction to —18° C. *(25)*. A new cooling apparatus has been developed which cuts the reaction time for cold rubber to eleven hours, and increases capacity by 20% *(26)*.

Oil-Extended Rubber: Oil-extended synthetic rubber, an outstanding development of the past year, is made by adding substantial proportions of rubber processing oil to the synthetic latex before coagulation. This method provides a sizeable extension of the rubber hydrocarbon with a more available, less expensive material. The commercial production of butadiene-styrene copolymer-oil mixtures has been established. Vulcanizates of the tire-tread type have as high tensile strength and are as resistant to heating in air as are corresponding GR-S vulcanizates, and the former show higher extensibility, better resistance to flex cracking, and lower strain modulus than do the latter.

Tires made of this butadiene-styrene copolymer-oil mixture have given better service than tires made either of standard GR-S or of cold GR-S. The abrasion resistance of the new oil-extended rubber is superior to both standard and cold GR-S and also natural rubber in passenger car tires. Tread adhesion has not been seriously affected by migration of the oil to the carcass *(27, 28, 29)*. Tire tread tests have shown an increase of 21% longer wear with the oil-extended rubber over standard or cold GR-S *(30)*. Investigations have shown that oil present in unvulcanized rubber separates the molecules and prevents bonding into a completely vulcanized mass, while the same amount of oil diffused into vulcanized rubber has a much less degrading action *(31)*.

An analysis of the hydrocarbon type of petroleum products used in rubber compounding has been developed which permits the writing of exact specifications for petroleum product compounding ingredients *(32, 33)*. There are two types of hydrocarbon molecules present in rubber processing oils from petroleum: (1) aromatic hydrocarbons, and (2) naphthene hydrocarbons. Different oils vary widely in composition and properties. Experiments indicate that oils relatively high in aromatic content improve the processibility, tensile strength, and modulus of rubber, while oils low in aromatics but high in naphthenes improve the low temperature properties, rebound, and color *(34)*.

Hypalon: A new rubberlike elastomer, Hypalon, has been introduced to the rubber industry. The elastomer is made by treating polyethylene with chlorine and sulfur dioxide. The structure, and therefore the properties, of chlorosulfonated polythene elastomers can be varied by using different molecular weight polythenes, and various percentages of sulfur and chlorine. The outstanding properties of Hypalon, as it is now offered commercially, are complete resistance to abrasion, heat, sunlight, and weather. Tests show that when other elastomers are blended with Hypalon, improved resistance to ozone results. Conventional rubber machinery can be used for compounding and processing Hypalon.

There are two methods of curing chlorosulfonated polythene: (1) with a combination of metal oxides, sulfur-type accelerators, and organic acids, and (2) with certain organic compounds in combination with acid acceptors. Since carbon black is not required in Hypalon, applications of this rubberlike material are independent of color. Some of the expected uses are white sidewall tires, tire treads, wire and cable coverings, coatings, mechanical goods, and protective films *(35-38)*.

Alfin Polymers: Further developments in the use of Alfin catalysts for the polymerization of butadiene have been made. Alfin catalysts are special combinations of sodium salts which cause rapid polymerization of butadiene to unusually high molecular weight polymers. Polymerization reactions of butadiene, styrene, and other monomers have been studied, using Alfin catalysts. It was found that hydrocarbon oils and carbon black could be incorporated during or immediately after the polymerization reactions, thus improving the processibility of the polymers. Until the use of this oil-extension principle, the use of Alfin catalyzed rubber was prevented by its extreme toughness, which made processing very difficult. Tires made of Alfin polymers are expected to be superior to both GR-S and natural rubber tires. The Alfin polymers have been successfully produced on a continuous pilot plant scale at the Government Laboratories at Akron, Ohio, and they are being evaluated in tires and other products *(39, 40, 41)*.

Other Types of Rubber: Neoprene Type WRT, a new synthetic rubber, has a much greater resistance to crystallization both before and after vulcanization than Type W, which it closely resembles. Also, Neoprene WRT has a high degree of resistance to compression set over a range of temperature of —40° C. to 150° C. *(42)*.

In contrast to the chlorine derivatives of butadiene, research on the introduction of fluorine into butadiene shows that there is no improvement in cold resistance or general physical properties of the resultant polymers *(43)*. As a substitute for styrene, sometimes scarce or relatively costly, vinyl toluene can be combined with butadiene to give a new synthetic material comparable to the best of the synthetic rubbers *(44)*.

Polybutadiene, as prepared by emulsion polymerization, is a rubbery material with a high degree of rebound, low tensile strength and only 25% elongation. When polybutadiene is baked at high temperatures, a rigid highly cross-linked resin is produced which is a heat-resistant, solvent-resistant, dimensionally stable material *(45)*.

Although rubber from the Hevea tree is the principal source of natural rubber for the United States, researches on the recovery of rubber from other sources, such as guayule, is not dormant *(46, 47)*. Recently the United States Department of Agriculture reported that, according to special tests, truck casings made of 100% guayule were equal to natural rubber truck tires and better than those containing synthetic rubber *(48)*.

Cellular Rubber

Because of the steadily increasing interest in cold rubber, researches which have been conducted on foam rubber show that when it is made of cold GR-S high solids latex rather than latex polymerized at 50° C. it has greater tensile strength, better elongation at break, higher modulus, improved rebound elasticity, and enhanced low temperature properties *(49)*. Further investigations in the field of foam rubber have shown that the sulfonyl hydrazide type of blowing agent has proved very satisfactory for rubber and plastics since it provides a fine, uniform cell structure and involves no processing difficulties *(50)*. Aging resistance to light of cellular rubbers made from latex has been found to be largely improved by the use of nickel dibutyldithiocarbamate (NBC) *(51)*. The undesirable odor of synthetic rubber latex, which is used chiefly in foam rubber products, has been overcome by the elimination of styrene from the formula, resulting in a polybutadiene latex. However, since polybutadiene latex made by the conventional "hot" process was too weak for most purposes,

a "cold" process was developed which gives an odorless polybutadiene latex with sufficient strength *(52)*.

Latex

Synthetic rubber latex developments include several new low temperature latices, some of which are polymerized to 50% solids and heat-concentrated to 60% solids. Other new products developed include latices containing no permanent electrolyte and emulsified with volatile base soaps, and latices prepared with cationic emulsifiers for coating and impregnating applications *(53)*.

In a study of cast films from mixtures of natural and synthetic rubber latex, it was found that cold rubber latices give better results than standard high temperature latices in the blends. For example, cold rubber latices imparted higher stress-strain values to blends with natural rubber than the hot rubber latices but they do not approach natural rubber latex in stress-strain properties *(54)*.

An investigation of two types of Hevea latex films, those vulcanized in the latex state and films vulcanized after drying, showed that the films cast from vulcanized Hevea latex were much more permeable to water vapor, sorbed considerably less water, and had a greater negative temperature dependence of permeability than films vulcanized after drying *(55)*.

Further development of the use of rubber latex in cement compounds has proved their applicability as bonding mortars in the construction of acid resisting brickwork. These rubber latex-cement compounds have excellent adhesive properties, considerable bond strengths, and reasonable compression strengths *(56)*.

Although butadiene-styrene latex paints have been widely accepted for interior use, similar formulations for use as exterior coatings were until recently unsatisfactory due to lack of storage stability. Now latex paints using butadiene-styrene as a binder and a pigment system consisting of a 40-40-20 mixture of titanium dioxide, zinc oxide, and mica has been found to give good results on exterior exposure on cement type or oil primed metal surfaces *(57)*.

Reclaimed Rubber

A newly developed continuous process for reclaiming scrap rubber has been found to cut time from three days to one hour *(58)*. In a study of the effects of blending reclaim with natural rubber, GR-S and Neoprene GN-A, blends of reclaim and Neoprene GN-A gave the best results, showing improved resistance to ozone, weathering and cut growth, increased tensile strength, and slightly decreased heat build-up *(59)*.

Adhesion

Materials which should find wide application in the chemical, electrical, and aircraft industries are obtained by bonding fluorocarbon plastics to metals and rubbers by a new bonding process. The fluorocarbon plastics are mechanically stable over a wide temperature range, have high resistance to most corrosive agents, and have high dielectric strength *(60)*. Investigations have also shown that Butyl rubber can be satisfactorily bonded to metal using a cement based on a chlorinated rubber and a diisocyanate *(61)*. It has been found that a high degree of flocculation of the carbon black in rubber-to-metal cements increases adhesion. This is ascribed to the surface activity of the carbon black *(62)*.

For the purpose of adhering silicones to various other surfaces a new primer has been developed during the past year, whereby silicone rubber can be bonded to certain metals and plastics. Some metal surfaces have a distinctly detrimental effect on the curing of the silicone rubber at the junction face when bonding is attempted with the new technique, and this prevents adhesion, but the difficulty can be eliminated by the correct choice of silicone rubber stock *(63)*.

Mechanical Goods

Nitrile rubber gaskets have virtually replaced composition cork, neoprene cork, and other types of special rubber gaskets in electrical apparatus. A reference list of sixteen uses of nitrile rubber gaskets in various electric assemblies has been compiled along with load deflection curves for nitrile rubber gaskets *(64)*. Until very recently it has not been considered possible to use the O-ring in a seal for a rotating shaft except at very slow rates of motion. However, tests have shown that these seals will work at speeds as high as 4000 rpm and also at pressures as high as 1000 psi *(65)*. GR-S has been found to give satisfactory service for pipe-joint rings, and it is believed that synthetic rubber is equal to or better than natural rubber for these rings *(66)*.

A recently developed torsion spring of particular significance for the wheel suspensions of vehicles has been developed. It consists basically of rubber cylinders contained within the spaces between concentric outer and inner shells or sleeves of polygonal cross-sections. The rubber rolls are assembled between the inner and outer tubes under slight radial compression and maintain the tubes in coaxial positions. No adhesive bond is present between the rubber parts and the tubes. Friction at the contact surfaces is the only resistance to slippage during deflection *(67)*.

Natural rubber and several types of synthetic rubber single compression mountings for machinery have been investigated with regard to the transmission of mechanical vibrations. The transmissibility of natural rubber was found to be lower than that of any of the synthetic rubbers, and was practically constant over a frequency range of 25 to 2000 cycles per second *(68)*.

Various design factors and their influence on the final form of the spring have been discussed with respect to the development of a spring for the independent suspension of the non-driven wheels of road vehicles *(69)*.

Air filters composed of electrostatic materials such as rubber hydrochloride, cyclized rubber, chlorinated rubber, polyethylene, polyisobutylene, or polystyrene are capable of collecting dust from the atmosphere when used in conventional forced draft heating, ventilating and air conditioning systems. Such filters function by electrostatic attraction and precipitation and are therefore effective throughout their entire thickness. They are easily cleaned by washing with cold water and can be reused without deterioration of their electrostatic properties *(70)*.

Blends of butadiene-acrylonitrile rubber and phenolics have proved that they provide improved impact strength, vibration fatigue, thermal shock resistance, good machinability, wear resistance, chemical resistance, and adequate electrical properties, and offer numerous possibilities for compression molding *(71)*.

Although the inflatable De-Icer has been used commercially for seventeen years to protect aircraft from the hazards of ice formation on their wings, the fundamental principles of ice removal have never been discussed in detail. Such an analysis has been made within the past year, and it was found that the removal of ice from a De-Icer surface depends on the true adhesion of ice to rubber and on the stress concentration produced by the operation of the device *(72)*.

Tires

Several studies have been made on the tread wear of tires. One method, which is independent of mileage, is based on the hypothesis that the log-log graph of tread depth loss versus mileage is linear *(73)*. A study of factors such as the effects of vehicle, wheel position, day of test, climatic conditions, and length of storage, by statistical road tests, has led to the conclusion that geometric rather than arithmetic averages should be used in the evaluation of tread wear. Also, a study of two methods of tire wear measurement, depth of tread grooves and weight loss, showed that a tire loses weight at essentially the same rate, whereas the depth of tread grooves decreases at a declining rate, resulting in a bias in tread wear ratings *(74)*.

In another investigation of tread wear measurement by the "weight" method and the "depth" method, it was concluded that the rate of wear changes with the age of the tire and climatic conditions. An evaluation of different rubbers and carbon blacks and an investigation of aging, seasonal effects and wheel position effects on tread wear were included in this study *(75)*. The extent to which the effects of nonlinear vibration characteristics of tread stocks are dependent upon temperature, compounding variables, and type of vibration has been investigated *(76)*.

Further developments have been made in the adhesion of tire cord to rubber. Solvent-extracted cottonseed meal has been found to compare favorably with casein for the bonding of tire cord to rubber *(77)*. To obtain good adhesion between rubber and Terylene polyester fiber, polyisocyanate adhesives give satisfactory bonds whereas casein and resorcinol-formaldehyde adhesives give poor adhesion *(78)*. Some aromatic diamines substantially increase the adherence of rayon cord to synthetic rubber *(79)*. A practical, reasonably quick method for evaluating the resistance of the adhesive bond between tire cord and rubber stock to dynamic fatigue employs the Roller-Flex machine, on which the test cords, cured in rubber and under tension, are subjected to rapid, cyclic flexure by being passed back and forth around small steel rollers *(80)*.

In an investigation of the changes in mechanical properties of tire cords subjected to dynamic fatigue, flex life and ultimate elongation were found to be cumulative, regardless of whether the cords were fatigued continuously or were allowed to relax with or without static tension between periods of flexing. Calculated activation energies for fatigue failure were less than those for heat degradation *(81)*. A study of thermal degradation in cotton and rayon tire cords, before and during processing, and after vulcanization, showed that tire cords which had been vulcanized in rubber were not as severely affected by heat as the unprocessed, dipped, or calendered cords *(82, 83)*. An investigation of the properties of rubber vulcanizates and cord upon rapid deformation has shown that both the elasticity modulus and the dynamic viscosity are related to the rebound *(84)*.

Certain sodium alkaryl sulfonates have been found to be the most effective conditioners for twisting cotton tire cord. Cords treated in this way show increased strength without loss in elongation if the elongation was not reduced too greatly by subsequent wet stretching *(85)*.

Compounding

In the compounding of rubber, the nature of the carbon black used, the amount, and the degree of dispersion in the rubber are all important factors in determining the physical properties of the resultant rubber compounds. It has been found that electrical resistivity of rubber vulcanizates is a simple and sensitive test for characterizing carbon blacks, and this test should prove to be useful for quality control of production and for specification purposes *(86)*.

Carbon black dispersion has been studied by various methods, such as the audio-radiographic technique with carbon 14, the electron microscope method, and by an interrelation of photometric, rheological, and electrical measurements *(87-90)*. Also, the electron microscope has been employed to study carbon gel in rubber and its role in the reinforcement of rubber *(91)*. Another reinforcing agent, lignin, has been found to impart a novel combination of properties when coprecipitated with natural, nitrile, neoprene, or GR-S rubbers. Good abrasion and tear resistance result, and the tensile strength is improved in certain cases. In GR-S, nitrile and natural rubbers, high elongation and low modulus are combined with high tensile strength and high hardness *(92)*.

By incorporating 20% by volume of commercial mica or powdered aluminum in natural rubber, the permeability can be reduced to one-third the value for an unloaded vulcanizate. Inner tubes made of these mixtures are being tested. It is hoped that these natural rubber compounds will approach Butyl rubber in its impermeability to gases, while retaining the advantages of natural rubber over Butyl rubber *(93)*.

Testing

Nondestructive aging tests for rubber have been devised for correlating natural aging with accelerated aging and service life. These tests are based on the change of electrical resistivity or of the strain produced by a given stress at varying time intervals on the same specimen *(94)*. In a comparison of the aging of rubber compounds under tropical conditions, it was found that samples aged under dry conditions in the Tropics are more influenced by bright sunlight than by heat aging. The use of a dark pigment reduces the depth of oxidation catalyzed by light *(95)*. A new method for determining aging resistance, which is less time consuming than the normal Geer test, involves the measurement of stress relaxation at constant elongation *(96)*.

To study the mechanism of rubber abrasion, an apparatus has been devised which employs a gramophone needle to abrade the rubber, and the movements of the needle are recorded photographically on a magnified scale. The abrasion produced by the needle is supposed to be similar to the strain set up in the tread during wear on the road *(97)*. The theory has been advanced that only by the application of an equation of the power law type in wear tests can true values of abrasion tests be assessed from the point of view of service tests *(98)*. Modifications of the Lambourn abrader and the National Bureau of Standards abrader have resulted in improved abrasion resistance tests for GR-S vulcanizates *(99, 100)*.

In an investigation of the permeability of rubber to organic liquids, it was found that polar liquids had the greatest permeability through the polar rubbers, while nonpolar liquids had the greatest permeability through nonpolar GR-S. Neoprene, which is weakly polar, had an intermediate position with all the liquids. Thiokol had the lowest permeability of the various rubbers. Permeability was found to increase logarithmetically with temperature for each rubber-liquid combination *(101)*.

A constant-stress method of testing elongation has

been developed to measure precisely the elastic properties of rubber compounds which are too soft to test on the conventional stress-strain machines. This method has been particularly useful for characterizing unvulcanized polymers and for evaluating plasticizers in uncured compounds *(102)*.

An electrical extensometer has been designed to be used in the ASTM Method of Tension Testing of Vulcanized Rubber to record automatically the elongation of the reduced section of the specimen throughout the test without interfering with the test and its attendant manipulations *(103)*. It has been found that the tensile strengths of vulcanizates of butadiene-styrene rubber, and also the elongation at rupture, decrease sharply with rise of temperature in the interval from 10° C. to 80° C. Further rise of temperature up to 140° C. only slightly changes this property *(104)*.

The mechanical properties, such as strain in a compression test, of a vulcanizate of known composition can be predicted by an empirical method which takes into account the imposed static strain, the shape factor, and the dynamic stiffening. The results are plotted in a general form in such a manner that the data can be used in solving general problems *(105)*. Experiments have shown that there is a definite relationship between strain measurements at 5 kg./cm.^{2} and modulus at 100% elongation *(106)*.

Recently developed methods for measuring the dynamic modulus and hysteresis of rubber compounds include a vector subtraction method, and a method employing a photoelectric device. An instrument based on the torsion pendulum principle has also been designed to measure the dynamic shear modulus and mechanical damping of rubberlike materials *(107, 108, 109)*. By the use of reduced variables, the temperature dependence and frequency dependence of dynamic mechanical properties of rubberlike materials can be interrelated without any arbitrary assumptions about the functional form of either. The use of the distribution function to predict various types of time-dependent mechanical behavior is illustrated *(110)*. Useful approximate relations have been derived by investigation of the mathematical structure of the integrals relating the distribution of relaxation times to the observed properties and by examination of the behavior of certain particular relaxation time distributions *(111)*.

An electrical analog for explaining elastomer behavior has shown that a creep for a model of GR-S tread stock obtained in a fraction of a second represents the creep observed in the actual stock in a period of 1000 hours *(112)*. The mechanical behavior of cylindrical specimens of elastomers at very small torsions can be studied by means of a recently introduced apparatus *(113)*.

The quality of a rubber is measured by the percentage of rubber hydrocarbon, and rubbers from different sources vary considerably in rubber hydrocarbon content. A new procedure for the quantitative determination of the hydrocarbon requires only the measurement of the refractive index of a solution containing a known weight of rubber in a known weight of solvent *(114)*.

A recently developed recording photoelectric interferometer simplifies the determination of transition temperatures in natural and synthetic rubbers and other high polymers. The instrument plots the varying length of a polymeric sample against temperature over the range —185° C. to 185° C. and then the transition temperatures are obtained as discontinuities in the curve *(115)*.

The static safety of a rubber product can be measured by a method which employs an electrostatic generator or induction coil to impose voltage in order to measure the ability of the product to dissipate an electrostatic charge, and the electrostatic voltmeter is used to determine the presence of, or degree of, the self-generated charge on a dynamic application *(116)*.

The beta ray gage, which is being used in the accurate measurement and control of products made in continuous sheet form, uses as a source of radiation an artificial radioisotope, Strontium 90, prepared at Oak Ridge *(117)*. To measure the pliant flow of rubberlike materials, an apparatus has been developed which should be useful in studying the properties and behavior of packings, printing rolls, offset-printing blankets, etc., and the tendency of tires to grip or skid *(118)*. To speed up the measurement of the load-deflection properties of vibration control mountings and of the elastomers used for vibration control, an improved machine has been developed whereby the speed-up is accomplished by means of an autographic recorder *(119)*.

Although a number of elastomers resistant to low temperatures have recently been developed, relatively little work has been done in standardizing the instruments and procedures used in evaluating their low temperature properties. Recently, studies have been made of the following low temperature test instruments and procedures: Admiralty indentometer, Gehman torsional tester, Clash-Berg torsion test, temperature-retraction test, low-temperature extension test, Gehman low-temperature flexibility test, compression set, stress-relaxation test, Shore hardness, rate of retraction, and refractive index *(120-123)*.

Another method for testing the flexibility of elastomers at temperatures down to —80° F. has been developed which has proved particularly useful in comparing the effects of different plasticizing systems *(124)*. An investigation of the modulus of elastomers at low temperatures has led to the conclusion that under prolonged constant strain at a low temperature greater than the second-order transition temperature, all elastomers show some crystallization, and this crystallization depresses the stress *(125)*. The temperature-retraction test has been found to be useful for the determination of the freezing point of elastomers and their tendency to crystallize *(126)*.

Gaskets for low temperature service give better performance when made of butadiene-styrene rubbers with different ratios of these constituents and/or different polymerization temperatures than standard GR-S, according to cold compression set tests performed at —35° F. *(127)*. The best plasticizers for reducing the cold compression set of GR-S at —35° F. have been selected from a total of 181 plasticizers *(128)*.

Ozone Degradation

Investigations of the action of ozone on rubber have been continued in the past year. A recently developed method for analyzing the results of ozone cracking is based on the fact that when crack growth takes place, the depth increases proportionally *(129)*. Various factors affecting the ozone resistance of rubber have been studied *(130,131)*. It has been shown by experiment that the type of carbon black used in rubber does not affect the rate or degree of cracking of the compounds upon exposure to either sunlight or ozone when under static stress *(132)*. The resistance of neoprene to ozone attack has been found to be affected adversely by fillers, and certain plasticizers, softeners, and extenders, while some antioxidants increased the ozone resistance. Some nondiscoloring-type antioxidants are harmful to the ozone resistance of neoprene *(133)*.

In general, the "frosting" of rubber, which experiments show is due to slow oxidation produced or catalyzed by ozone, is minimized or prevented by antioxidants, certain accelerators, reclaim made by the alkali process, latex-sprayed rubber and strongly oxidized rubber. "Frosting" is promoted by vulcanizing in ammonia gas, an insufficiency or excess of certain accelerators, rosin, mineral oils, cotton flock, prolonged mastication of the rubber before addition of compounding ingredients, and ozonizing rubber before mastication *(134)*.

A study of the ozone cracking of natural rubber, standard GR-S and low temperature GR-S at several elongations and temperatures showed that the natural rubber compound cracked at lower temperatures and elongations than either standard or low-temperature GR-S, and for each temperature there existed an elongation below which no sample cracked *(135)*.

An investigation has been made of the possibility of using infra-red spectrographic techniques to measure ozone degradation by compositional changes rather than the conventional variation in physical properties *(136)*. Rubber products exposed to the atmosphere in the Los Angeles area developed characteristic ozone cracking more rapidly than in most other parts of the United States *(137)*. Studies of the action of ozone on rubber have proved useful in the quantitative determination of atmospheric ozone *(138, 139)*.

Conclusion

It is hoped that this survey will illustrate to the engineer the types of problems with which the rubber technologist is confronted and that cooperation with the engineer is essential in solving many of these problems.

LITERATURE REFERENCES

(1) *Akron Beacon Journal*, December 15, 1951.
(2) *Akron Beacon Journal*, April 19, 1952.
(3) *Akron Beacon Journal*, March 26, 1952.
(4) "Rubber Act extended for twenty-one months; requires RFC disposal plan by March 1, 1953." *Rubber Age (N. Y.)*, **71,** 516 (July, 1952).
(5) *Akron Beacon Journal*, September 17, 1952.
(6) "Paley Commission Report on rubber." (Chapter 20, "Rubber—Natural and Synthetic," from President's Materials Policy Commission Report of June 23, 1952. William S. Paley, chairman of the commission.) *India Rubber World*, **126,** 501-04 (July, 1952).
(7) *Akron Beacon Journal*, November 18, 1951.
(8) "NPA removes restrictions on purchase of cold government-produced synthetic rubber." *Rubber Age (N. Y.)*, **71,** 788 (September, 1952).
(9) "Cold rubber saves $700,000,000." Joseph F. Kuebler, *Akron Beacon Journal*, September 5, 1952.
(10) "Rubber." J. T. Cox, Jr., *Chem. Eng. News*, **30,** 20-21 (January 7, 1952).
(11) "GR-S latex—1951." L. H. Howland and V. C. Neklutin. *India Rubber World*, **126,** 371-72 (June, 1952).
(12) "Hevea latex during 1951." C. R. Peaker. *India Rubber World*, **126,** 372-73 (June, 1952).
(13) "A preventive program to meet a coming rubber shortage." P. W. Litchfield. Notes on America's Rubber Industry, New Series No. 18 (April 30, 1952).
(14) "Paley report predicts rubber consumption to double by 1975; Rubber Act extended for 21 months." *India Rubber World*, **126,** 518-19 (July, 1952).
(15) *Akron Beacon Journal*, June 22, 1951.
(16) *Akron Beacon Journal*, May 14, 1952.
(17) *Akron Beacon Journal*, August 15, 1952.
(18) *Akron Beacon Journal*, August 22, 1951.
(19) *Akron Beacon Journal*, September 13, 1951.
(20) *Akron Beacon Journal*, March 16, 1952.
(21) "GR-S price likely to remain at 23c; butadiene now 18c." *India Rubber World*, **127,** 95 (October, 1952).
(22) "Akron companies keeping hopeful watch on Brazil plan to spur rubber growing." Ray C. Sutliff. *Akron Beacon Journal*, April 27, 1952.
(23) "A living stockpile for national security." P. W. Litchfield. Notes on America's Rubber Industry, New Series No. 16 (December, 1951).
(24) "Possibilities of developing rubber culture in Africa." M. Bocquet. *Rev. gen. caoutchouc*, **28,** 453-58 (July, 1951).
(25) "Butadiene-styrene rubbers: Some effects of polymerization temperature and molecular weight." J. R. Beatty and B. M. G. Zwicker. *Ind. Eng. Chem.*, **44,** 742-52 (April, 1952).
(26) "Speed up cold rubber output." *Chem. Eng.*, **59,** No. 1, 220 (January, 1952).
(27) "The production and utilization of high-Mooney-viscosity synthetic rubber." H. D. Harrington, K. V. Weinstock, N. R. Legge and E. B. Storey. *India Rubber World*, **124,** 435-42 (July, 1951); 571-75 (August, 1951).
(28) "Recent developments in the field of oil-enriched rubbers." K. V. Weinstock, L. M. Baker and D. H. Jones. *Rubber Age (N. Y.)*, **70,** 333-38 (December, 1951).
(29) "New process adds 25% more cold rubber." *Chem. Eng.*, **59,** No. 3, 213 (March, 1952).
(30) Seventh Foundation Lecture of the Institution of the Rubber Industry, on the economic and physical aspects of GR-S modifications, presented by R. P. Dinsmore in Wolverhampton, England, on May 23, 1952. Abstract: *Rubber Age (N. Y.)*, **71,** 371 (April, 1952).
(31) "The effects of oils in rubber." Ira Williams. Paper presented at the Rubber Division, American Chemical Society, meeting in Cincinnati on May 1, 1952. Abstracts: *India Rubber World*, **126,** 87 (April, 1952); *Rubber Age (N.Y.)*, **70,** 753 (March, 1952).
(32) "Determination of the hydrocarbon type of petroleum products (and its significance for rubber compounding)." Fritz S. Rostler and Richard M. White. *Rubber Age (N. Y.)*, **70,** 735-47 (March, 1952).
(33) "Code and specifications for identification of plasticizers from petroleum." Fritz S. Rostler. *Rubber Age (N. Y.)*, **71,** 223-28 (May, 1952).
(34) "Hydrocarbon composition of rubber processing oils." Stewart S. Kurtz, Jr., and Charles C. Martin. Paper presented at the Rubber Division, American Chemical Society, meeting in Cincinnati on May 1, 1952. Abstracts: *Rubber Age (N. Y.)*, **70,** 753 (March, 1952); *India Rubber World*, **126,** 87 (April, 1952).
(35) "Chlorosulfonated polythene. I. A new elastomer." R. E. Brooks, D. E. Strain and A. McAlevy. Paper presented at the Rubber Division, American Chemical Society, meeting in Cincinnati on April 30, 1952. Abstracts: *India Rubber World*, **126,** 86 (April, 1952); *Rubber Age (N. Y.)*, **70,** 751 (March, 1952).
(36) "Chlorosulfonated polythene. II. Metal oxide curing systems." M. A. Smook, I. D. Roche, W. B. Clark, O. G. Youngquist. Paper presented at the Rubber Division, American Chemical Society, meeting in Cincinnati on April 30, 1952. Abstracts: *India Rubber World*, **126,** 86 (April, 1952); *Rubber Age (N. Y.)*, **70,** 751 (March, 1952).
(37) "Chlorosulfonated polythene. III. Organic curing agents." W. F. Busse and M. A. Smook. Paper presented at the Rubber Division, American Chemical Society, meeting in Cincinnati on April 30, 1952. Abstracts: *India Rubber World*, **126,** 86 (April, 1952); *Rubber Age (N. Y.)*, **70,** 751 (March, 1952).
(38) "Hypalon S-2—a new elastomer." R. R. Warner. *Rubber Age (N. Y.)*, **71,** 205-21 (May, 1952).
(39) "The Alfin rubbers—a new type of polymer." A. A. Morton. Paper presented at the meeting of the Buffalo Rubber Group on March 4, 1952.
(40) "Polymerization reactions with Alfin catalysts." R. A. Stewart and H. Leverne Williams. Paper presented at the Rubber Division, American Chemical Society, meeting in Cincinnati on May 1, 1952. Abstracts: *India Rubber World*, **126,** 88 (April, 1952); *Rubber Age (N. Y.)*, **70,** 754 (March, 1952).

(41) "Structure of alkali metal-catalyzed butadiene polymers." A. W. Meyer, R. R. Hampton and J. A. Davison. *J. Am. Chem. Soc.*, **74,** 2294-96 (May 5, 1952).
(42) "An improved Neoprene—Type WRT." R. R. Radcliff. *India Rubber World*, **125,** 311-14 (December, 1951).
(43) "Polymerization of 2, 3-difluorobutadiene and 2-chloro-3-fluorobutadiene." L. B. Wakefield. *Ind. Eng. Chem.*, **43,** 2363-66 (October, 1951).
(44) "New rubber avoids use of styrene." Joseph E. Kuebler. *Akron Beacon Journal*, December 5, 1951.
(45) "Highly cross-linked polybutadiene; preparation and mechanical behavior." John A. Coffman. *Ind. Eng. Chem.*, **44,** 1421-28 (June, 1952).
(46) "Rubber recovery from freshly harvested guayule." K. W. Taylor and R. L. Chubb. *Ind. Eng. Chem.*, **44,** 879-82 (April, 1952).
(47) "Development of pilot plant control for milling guayule shrub." K. W. Taylor and R. L. Chubb. *Ind. Eng. Chem.*, **44,** 883-87 (April, 1952).
(48) "Agriculture Department cites guayule truck tire findings." *Rubber Age (N. Y.)*, **70,** 764 (March, 1952).
(49) "GR-S latices in foam rubber." L. Talalay and A. Talalay. *Ind. Eng. Chem.*, **44,** 791-95 (April, 1952).
(50) "Sulfonyl hydrazide blowing agents for rubber and plastics." B. A. Hunter and D. L. Schoene. *Ind. Eng. Chem.*, **44,** 119-22 (January, 1952).
(51) "Protection of cellular rubber. Action of nickel dibutyldithiocarbamate on the photodegradation of natural rubber." C. Pinazzi. *Rev. gen. caoutchouc*, **28,** 567-70 (August, 1951).
(52) "No styrene, no odor." *Chem. Week*, **70,** No. 16, 54 (April 19, 1952).
(53) "Synthetic rubber latex developments." L. H. Howland, V. C. Neklutin, R. W. Brown, and H. G. Werner. *Ind. Eng. Chem.*, **44,** 762-69 (April, 1952).
(54) "Film from mixtures of natural and synthetic rubber latex." R. M. Pierson, R. J. Coleman, T. H. Rogers, Jr., D. W. Peabody and J. D. D'Ianni. *Ind. Eng. Chem.*, **44,** 769-73 (April, 1952).
(55) "Water vapor permeability and sorption of Hevea latex films." William W. Bowler. *Ind. Eng. Chem.*, **44,** 787-91 (April, 1952).
(56) "Use of rubber latex in cement compounds." Leslie H. Griffiths. *India Rubber J.*, **122,** 304-07, 315 (February 23, 1952).
(57) "Butadiene-styrene latex paints for exterior use." L. L. Ryden, L. G. Treat and D. A. Taber. Official Digest, Federation Paint & Varnish Production Clubs No. 329, 357-64 (June, 1952).
(58) "How to slash devulcanizing time." *Chem. Eng.*, **58,** No. 7, 192, 194 (July, 1951).
(59) "Compounding reclaim with new elastomers for high quality at low cost." M. F. Torrence and H. G. Schwartz. *Rubber Age (N. Y.)*, **71,** 357-60 (June, 1952).
(60) "Fluorocarbon plastics bonded to metals and rubbers to provide new composite materials." *Materials & Methods*, **35,** No. 3, 96-97 (March, 1952).
(61) "Polyisocyanates in bonding; rubber to metals." T. J. Meyrick and J. T. Watts. *India Rubber J.*, **122,** 505-06 (March 29, 1952).
(62) "Carbon black flocculation in rubber to metal cements." G. M. Sheehan, G. Kraus, and A. B. Conciatori. *Ind. Eng. Chem.*, **44,** 580-82 (March, 1952).
(63) "Silicone rubber can now be bonded." R. S. Johannsen. *General Electric Review*, **55,** No. 2, 54-57 (February, 1952).
(64) "Nitrile rubber gaskets make better seals." T. C. Aitchison and B. N. Bowers. *General Electric Review*, **55,** No. 3, 46-49 (March, 1952).
(65) "A new rotary seal for high-speed and high-pressure applications." T. J. McCuistion. *India Rubber World*, **125,** 575-78, 581 (February, 1952).
(66) "Comparison between synthetic and natural rubber pipe-joint rings." W. L. White. *J. Am. Water Works Assoc.*, **43,** 872-76 (November, 1951).
(67) "Elastic rubber cushion springs (for torque load applications)." R. Iredell. *Product Eng.*, **23,** No. 3, 119-23 (March, 1952).
(68) "Transmission of mechanical vibrations through rubbers." R. D. Morris, R. R. James, and H. L. Snyder. *Ind. Eng. Chem.*, **43,** 2540-47 (November, 1951).
(69) "Development and testing of a series of rubber suspension units." A. E. Moulton. *Trans. Inst. Rubber Ind.*, **27,** 313-24 (December, 1951).
(70) "Self-charging electrostatic air filters." W. T. Van Orman and H. A. Endres. *Heating, Piping and Air Conditioning*, **24,** 157-63 (January, 1952).
(71) "Why rubber-phenolics?" *Modern Plastics*, **29,** No. 6, 71-77 (February, 1952).
(72) "The physics of the mechanical removal of ice from aircraft." D. L. Loughborough. *Aeronaut. Eng. Rev.*, **11,** No. 2, 29-34 (February, 1952).
(73) "Evaluation of tread wear." D. G. Stechert and T. D. Bolt. *Anal. Chem.*, **23,** 1641-46 (November, 1951).
(74) "Some factors influencing the road wear of tires." R. D. Stiehler, M. N. Steel and J. Mandel. *Trans. Inst. Rubber Ind.*, **27,** 298-312 (December, 1951).
(75) "Tread wear of tires." J. Mandel, M. N. Steel and R. D. Stiehler. *Ind. Eng. Chem.*, **43,** 2901-08 (December, 1951).
(76) "Vibration characteristics of tread stocks." K. E. Gui, C. S. Wilkinson, Jr., and S. D. Gehman. *Ind. Eng. Chem.*, **44,** 720-23 (April, 1952).
(77) "Cottonseed meal as a tire cord-to-rubber adhesive." W. H. Hoffman, Jr., and J. C. Arthur, Jr. *Rubber Age (N. Y.)*, **71,** 354-56 (June, 1952).
(78) "Polyisocyanates in bonding; Terylene polyester fiber to rubber." J. T. Meyrick and J. T. Watts. *India Rubber J.*, **122,** 467-68 (March 22, 1952).
(79) "Improvement of the adherence of bicycle or motor tire cord to synthetic rubber." E. Profft. *Rev. gen. caoutchouc*, **29,** 409-11 (June, 1952).
(80) "Evaluating dynamic fatigue of adhesion of tire cords to rubber stocks." W. J. Lyons. *Anal. Chem.*, **23,** 1255-59 (September, 1951).
(81) "Effect of a dynamic fatigue test on the mechanical properties of tire cords." James N. Grant, Geraldine M. Couturier, and Mary W. Rhodes. *Textile Research J.*, **21,** 867-75 (December, 1951).
(82) "Thermal degradation in tire cords. I. Effects on strength, elongation and degree of polymerization." Carl M. Conrad, Verne W. Tripp and Trinidad Mares. *Textile Research J.*, **21,** 726-39 (October, 1951).
(83) "Thermal degradation in tire cords. II. Effects on strength, elongation and degree of resilience." Verne W. Tripp, Trinidad Mares, and Carl M. Conrad. *Textile Research J.*, **21,** 840-46 (November, 1951).
(84) "The properties of rubber vulcanizates and cord upon rapid deformation." P. Kainradl and F. Handler. *Kautschuk und Gummi*, **5,** No. 2, WT 22-7 (February, 1952).
(85) "Alkaryl sulfonates as conditioners in wet twisting cotton tire cord." J. C. Ambelang, J. A. Shotton, G. W. Gottschalk, H. P. Stevens, and G. E. P. Smith, Jr. Paper presented at the Rubber Division, American Chemical Society, meeting in Cincinnati on April 30, 1952. Abstracts: *India Rubber World*, **126,** 87 (April, 1952); *Rubber Age (N. Y.)*, **70,** 752 (March, 1952).
(86) "Carbon black differentiation by electrical resistance of vulcanizates." J. E. McKinney and F. L. Roth. *Ind. Eng. Chem.*, **44,** 159-63 (January, 1952).
(87) "Autoradiographic technique with carbon 14 in rubber." A. D. Kirshenbaum, C. W. Hoffman and A. V. Grosse. *Anal. Chem.*, **23,** 1440-45 (October, 1951).
(88) "Studies in the dispersion of SRF carbon black in Butyl rubber." F. P. Ford and A. Y. Mottilau. *Rubber Age (N. Y.)*, **70,** 457-63 (January, 1952).
(89) "Carbon black dispersion and reinforcement." F. M. Dannenberg. *Ind. Eng. Chem.*, **44,** 813-18 (April, 1952).
(90) "Some problems of Butyl rubber-carbon black systems." F. P. Ford and A. M. Gessler. *Ind. Eng. Chem.*, **44,** 819-24 (April, 1952).
(91) "Carbon gel as revealed by the electron microscope." W. A. Ladd and N. W. Ladd. *Ind. Eng. Chem.*, **43,** 2564-68 (November, 1951).
(92) "Lignin-reinforced nitrile, neoprene, and natural rubbers." J. J. Keilen, W. K. Dougherty, and W. R. Cook. *Ind. Eng. Chem.*, **44,** 163-67 (January, 1952).

(93) "Reduction by fillers of the permeability of natural rubber to gases." P. Thirion. *Rev. gen. caoutchouc,* **28,** 684-91 (October, 1951).
(94) "Nondestructive aging tests for rubber." R. F. Shaw and S. R. Adams. *Anal. Chem.,* **23,** 1649-52 (November, 1951).
(95) "Deterioration of rubber under the influence of light and dry and moist heat." A. L. Soden. *Trans. Inst. Rubber Ind.,* **27,** 223-31 (August, 1951).
(96) "Relation between stress relaxation and aging resistance of rubber vulcanizates; some preliminary investigations." H. L. Pedersen and B. Nielsen. *J. Polymer Sci.,* **7,** 97-103 (August-September, 1951).
(97) "Elementary aspects of rubber abrasion." A. Schallmach. Paper presented at the Symposium on Abrasion, Delft, on November 14 and 15, 1951. Abstract: *India Rubber J.,* **122,** 843 (November 24, 1951).
(98) "Abrasion and wear of rubber; analysis of wear curves." J. M. Buist. *India Rubber J.,* **121,** 180-82 (August, 1951).
(99) "Wear resistance of vulcanized elastomers." J. C. Burns and E. B. Storey. *Ind. Eng. Chem.,* **44,** 825-30 (April, 1952).
(100) "Abrasion resistance of GR-S vulcanizates." J. W. Adams, J. A. Reynolds, W. E. Messer, and L. H. Howland. *Rubber Chem. Tech.,* **25,** 191-208 (April-June, 1952).
(101) "Permeability of rubber to organic liquids." W. J. Mueller. Paper presented at the Rubber Division, American Chemical Society, meeting in Cincinnati on April 30, 1952. Abstracts: *India Rubber World,* **126,** 86 (April, 1952); *Rubber Age (N. Y.),* **70,** 752 (March, 1952).
(102) "Elasticity of soft polymers; constant-stress elongation tests." C. A. Dahlquist, J. O. Hendricks, and N. W. Taylor. *Ind. Eng. Chem.,* **43,** 1404-10 (June, 1951); *Rubber Chem. Tech.,* **25,** 56-70 (January-March, 1952).
(103) "An electrical extensometer for determining elongation of elastomers." C. H. Klute, C. J. Penther, and L. B. McKee. *ASTM Bull.,* No. 180, 44-49 (February, 1952).
(104) "Effect of temperature and rate of stretching on the tensile strength of vulcanizates." B. A. Dogadkin and D. M. Sandomirskii. *Kolloidnyi Zhurnal,* **13,** 267-72 (July-August, 1951); *Rubber Chem. Tech.,* **25,** 50-55 (January-March, 1952).
(105) "Relationships between the physical properties of rubber used in engineering." S. G. Leontein. *Trans. Inst. Rubber Ind.,* **28,** 27-72 (February, 1952).
(106) "Relationship between 'modulus' and 'strain' in pure gum natural rubber vulcanizates." R. F. Blackwell. *Trans. Inst. Rubber Ind.,* **28,** 75-84 (April, 1952).
(107) "The measurement of the dynamic modulus of elastomers by a vector subtraction method." C. W. Painter. *ASTM Bull.,* No. 177, 45-47 (October, 1951).
(108) "Apparatus for the measurement of the dynamic shear modulus and hysteresis of rubber at low frequencies." W. R. Fletcher. *J. Sci. Instruments,* **29,** 186-88 (June, 1952).
(109) "Recording torsion pendulum for the measurement of the dynamic mechanical properties of plastics and rubbers." L. E. Nielsen. *Rev. Sci. Instruments,* **22,** 690-93 (September, 1951).
(110) "Temperature dependence of dynamic properties of elastomers; relaxation distributions." John D. Ferry, Edwin R. Fitzgerald, Lester D. Grandine, Jr., and Malcolm L. Williams. *Ind. Eng. Chem.,* **44,** 703-07 (April, 1952).
(111) "Correlation of dynamic and static measurements on rubberlike materials." R. D. Andrews. *Ind. Eng. Chem.,* **44,** 707-15 (April, 1952).
(112) "An electrical analog method for explaining elastomer behavior." R. B. Stambaugh. Paper presented at the 12th International Congress of Pure and Applied Chemistry, September 10, 1951. Abstract: *Rubber Age (N. Y.),* **69,** 583 (August, 1951).
(113) "Behavior of elastomers at small torsions." K. H. Meyer, A. J. A. van der Wyk and W. Gonon. Paper presented at the 12th International Congress of Pure and Applied Chemistry, September 10, 1951. Abstract: *Rubber Age (N. Y.),* **69,** 583 (August, 1951).
(114) "Quantitative determination of natural rubber hydrocarbon by refractive index measurements." R. J. Fanning and N. Bekkedahl. *Anal. Chem.,* **23,** 1653-56 (November, 1951).
(115) "Photoelectric interferometer for high polymer research." *Rubber Age (N. Y.),* **70,** 216-17 (November, 1951).
(116) "Electrostatic potential 'bleed-off' in rubber compounds." J. A. Hurry, T. D. Bolt and W. E. French. *India Rubber World,* **124,** 689-95 (September, 1951).
(117) "Use of the beta ray gage in the rubber industry." G. B. Foster. Paper presented at the Rubber Division, American Chemical Society, meeting in Cincinnati on May 1, 1952. Abstracts: *India Rubber World,* **126,** 87 (April, 1952); *Rubber Age (N. Y.),* **70,** 752 (March, 1952).
(118) "Pliant flow of rubber and similar industrial raw materials." J. Bekk. *Kautschuk und Gummi,* **4,** 250-53 (July, 1951).
(119) "Measuring the load-deflection properties of vibration-control mountings and of elastomers." *Rubber Age (N. Y.),* **70,** 475-76 (January, 1952).
(120) "Physical properties of natural and synthetic rubber materials at low temperatures." J. Z. Lichtman and C. K. Chatten. *Anal. Chem.,* **24,** 812-17 (May, 1952).
(121) "A study of various low temperature test procedures." A. F. Helin and B. G. Labbe. *India Rubber World,* **126,** 227-31 (May, 1952); 365-68 (June, 1952).
(122) "Spectrometric determination of refractive index at low temperatures." Richard H. Wiley and Robert R. Garrett. *J. Polymer Sci.,* **7,** 121-31 (August, 1951).
(123) "A test for crystallization in rubbers." J. R. Beatty. *India Rubber World,* **125,** 438-39 (January, 1952).
(124) "A low-temperature flexibility tester." M. A. Pollack. *Rubber Age (N. Y.),* **69,** 713-17 (September, 1951).
(125) "Modulus and relaxation of elastomers in torsion at low temperatures." M. Mooney and W. E. Wolstenholme. *Ind. Eng. Chem.,* **44,** 335-42 (February, 1952).
(126) "The T-R (temperature-retraction) test for characterizing the low-temperature behavior of elastomeric compositions." J. F. Svetlik and L. R. Sperberg. *Rubber Chem. Tech.,* **25,** 140-51 (January-March, 1952).
(127) "Butadiene polymers for low temperature service." R. E. Morris, J. W. Hollister and F. L. Shew. *Ind. Eng. Chem.,* **43,** 2496-2500 (November, 1951).
(128) "Plasticizers for GR-S gasket stocks to be used at low temperatures." R. E. Morris and J. W. Hollister. *Rubber Age (N. Y.),* **70,** 195-203 (November, 1951).
(129) "Ozone crack depth analysis for rubber." J. S. Rugg. *Anal. Chem.,* **24,** 818-21 (May, 1952).
(130) "A study of the factors affecting the weathering of rubberlike materials." E. W. Ford and L. V. Cooper. *India Rubber World,* **124,** 696-98, 701 (September, 1951); **125,** 55-60 (October, 1951).
(131) "Static exposure testing of automotive compounds." H. A. Winkelmann. *Ind. Eng. Chem.,* **44,** 841-49 (April, 1952).
(132) "Ozone and sunlight effect on aging of carbon black vulcanizates." George E. Popp and Lynn Harbison. *Ind. Eng. Chem.,* **44,** 837-40 (April, 1952).
(133) "Ozone resistance of neoprene vulcanizates: Effect of compounding ingredients." D. C. Thompson, R. H. Baker, and R. W. Brownlow. *Ind. Eng. Chem.,* **44,** 850-56 (April, 1952).
(134) "The frosting of rubber: Its occurrence, cause, prevention, and nature." J. T. Beaudry. *Rubber Age (N. Y.),* **69,** 429-32 (July, 1951).
(135) "Cracking of rubber and GR-S in ozone. Effects of temperature and elongation." G. R. Cuthbertson and D. D. Dunnom. *Ind. Eng. Chem.,* **44,** 834-37 (April, 1952).
(136) "Ozone deterioration of elastomeric materials." A. R. Allison and I. J. Stanley. *Anal. Chem.,* **24,** 630-35 (April, 1952).
(137) "Ozone in Los Angeles and surrounding areas." A. W. Bartel and J. W. Temple. *Ind. Eng. Chem.,* **44,** 857-61 (April, 1952).
(138) "The application of rubber in the quantitative determination of ozone." C. E. Bradley and A. J. Haagen-Smit. *Rubber Chem. Tech.,* **24,** 750-55 (October-December, 1951).
(139) "Atmospheric ozone—a simple approximate method of measurement." J. Crabtree and R. H. Erickson. *India Rubber World,* **125,** 719-20 (March, 1952).

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Division of Rubber Chemistry, A. C. S., Meets in Los Angeles on March 18-19

THE 62nd meeting of the Division of Rubber Chemistry of the American Chemical Society will be held at the Hotel Statler in Los Angeles, California, on Wednesday and Thursday, March 18 and 19. It will be a regular divisional meeting, and will be held in conjunction with the 123rd national meeting of the parent society, which starts on March 15.

The divisional meeting will feature the presentation of twenty technical papers spread over three sessions. As usual, the papers have been grouped generally by subject, the first series devoted to rubbers and rubberlike polymers, the second to chemical and physical tests, and the third to carbon blacks. Social highlites at the meeting will include a special Old Timers' Luncheon, to be held at the Hotel Statler on Wednesday, March 18, and the regular divisional banquet, which will also be held at the Statler on Thursday evening, March 19.

Abstracts of the 20 papers scheduled for presentation, together with their authors and company connections, follow:

Program of the

DIVISION OF RUBBER CHEMISTRY
AMERICAN CHEMICAL SOCIETY

Hotel Statler, Los Angeles, Calif.
March 18-19, 1953

Wednesday Morning—March 18

9:00 A.M.—Registration
12:00 Noon—Old Timers' Luncheon, Hotel Statler.

Wednesday Afternoon—March 18

2:00 P.M.—Introductory Remarks by Seward G. Byam (DuPont), Division Chairman.
2:10 P.M.—Technical Papers.

Thursday Morning—March 19

9:00 A.M.—Technical Papers.

Thursday Afternoon—March 19

2:00 P.M.—Technical Papers.

Thursday Evening—March 19

7:00 P.M.—Divisional Banquet, Hotel Statler.

ABSTRACTS OF PAPERS

Wednesday Afternoon—March 18

2:00 P. M.—1—Introductory Remarks, *Seward G. Byam.*

2:10 P. M.—2—Aging Characteristics of Crude Guayule Rubber. *W. J. Gowans and F. E. Clark (Natural Rubber Research Station, U. S. Department of Agriculture, Salinas, Calif.). (Paper will be presented by Mr. Gowans).*

The aging characteristics of crude guayule rubber were investigated by means of an accelerated aging test based on volumetric oxygen absorption measurements. Different methods of processing guayule rubber were found to have significant effects upon the stability of the rubber.

Removal of the resinous constituents by acetone extraction greatly improves resistance to deterioration. Presence of a metal sequestering agent in the milling liquid during the process of recovering the rubber from the shrub is also effective in reducing the rate of oxygen absorption.

A total of 26 different antioxidants were tested as to their respective abilities to preserve both resinous and deresinated crude guayule rubbers. These antioxidants were added in one percent concentrations based on the weight of the rubber. Beta and alpha conidendrol, phenolic types of compounds obtained as by-products from the wood pulp and paper industry, appeared to be the best antioxidants for both resinous and deresinated rubbers. AgeRite White (di-beta-naphthyl-para-phenylenediamine) is another excellent antioxidant.

Crude deresinated guayule rubber without added antioxidant does not age as well as does No. 1 smoked sheet and pale crepe crude Hevea rubbers, but shows superior aging qualities when one percent AgeRite White is added.

2:35 P. M.—3—An Improved Method of Determining Rubber Hydrocarbon in Rubber-Bearing Plants. *J. W. Meeks, R. V. Crook, C. E. Pardo, Jr., and F. E. Clark (Natural Rubber Research Station, U. S. Department of Agriculture, Salinas, Calif.). (Paper will be presented by Mr. Clark).*

The conventional method of determining rubber hydrocarbon in rubber-bearing plant material consists of comminution of the tissue to pass a 3 mm. hammermill screen, followed by extraction with water, alcohol, and benzene respectively. The benzene extract after evaporation is weighed as rubber hydrocarbon. The major disadvantages of the method are: (1) the method is time-consuming, requiring a minimum of three days to complete an analysis; (2) all of the rubber is not extracted because the method of comminution does not rupture all of the plant cells; and (3) the benzene extract may contain impurities and is susceptible to oxidation during the drying operation.

These disadvantages are overcome in the improved method described in this paper. Comminution is carried out by crushing through corrugated and smooth rolls so that essentially all of the cells are ruptured and complete extraction can be accomplished. Benzene extraction is carried out by shaking with gravel in a shaking machine and can be effected in as short a time as two minutes. The rubber hydrocarbon is determined by a bromination procedure previously described by Gowans and Clark.

Detailed procedures are given and calculations of precision are made. Application of the method to several types and age classes of guayule shrub is shown.

2:55 P. M.—4—Some Recent Developments in Polymerization of GR-S at Low Temperatures. *L. H. Howland, V. C. Neklutin, R. L. Provost, and F. A. Mauger (Naugatuck Chemical Division, U. S. Rubber Co., Naugatuck, Conn.). (Paper will be presented by Dr. Howland).*

Recent investigations by the authors in the field of low temperature GR-S polymerization have resulted in several technical advances. Polymerizations employing all rosin soap emulsification at 41°F. have been successfully activated with

the lower polyethylene polyamines, diethylene triamine and triethylene tetramine. At 0°F., polymerizations activated with triethylene tetramine have been conducted in an emulsifier system composed of 85 percent disproportionated rosin soap and 15 percent fatty acid soap. Data were obtained concerning the effect of methanol as an antifreeze in subfreezing polymerization recipes and it is indicated that the methanol has a deleterious effect on polymer quality. Very fast 41°F. polymerization recipes were developed for use in reactors equipped with auxiliary cooling surface such as an external heat exchanger, and for continuous polymerization in tubular type reactors. Pilot plant trials of the externally cooled reaction system and the continuous tubular type system are described. Shortstopping of cold polymerizations is also discussed.

3:20 P. M.—5—Chemical Nature of Extenders and Their Standardization for Use in Oil-Extended Rubbers. ***Fritz S. Rostler and R. M. White (Golden Bear Oil Co., Oildale, Calif.). (Paper will be presented by Dr. Rostler).***

Development work and industrial utilization of oil-extended rubbers masterbatched in the latex stage have been retarded by lack of standardization of the extenders. This lack of standardization is primarily due to disagreement among workers in the field on the chemical nature of the extenders used and to the absence of uniform nomenclature. Discussions about assumed, but unproven, chemical structures and about work on composition of petroleum unrelated to rubber compounding have obscured the real issues, which are (1) determination of components of extenders regulating their behavior in rubber, (2) definition of extenders on the basis of quantitatively determinable values, and (3) selection of analytical methods suitable for control tests.

This paper is an attempt to summarize present-day knowledge of composition of extenders and to correlate and clarify the above-mentioned three issues in accord with facts proven by experiments and applicable to rubber compounding. Chemical nature of extenders is discussed on the basis of quantitative data on extenders and their components obtained by employing the previously discussed group analysis and elementary analysis, and it is shown that the chemical nature of extenders and their function are best understood by applying principles validated and proven by classic organic chemistry. Interdependence of the chemical nature of the extenders and their origin is shown by a chart following the manufacture of the extenders, giving composition of the starting materials and their fractions. It is concluded that standardization of extenders in oil-extended rubbers is attainable on the basis of correlation of quantitative analytical data with chemical nature only if it is indicative of behavior in rubber compounding.

3:45 P. M.—6— High Styrene Resin Reinforcement of Hard Rubber Stocks. ***Harold S. Sell and Robert J. McCutcheon (Chemical Products Development Division, Goodyear Tire & Rubber Co., Akron, Ohio).***

High styrene resins are well known for their hardening and stiffening action in soft rubber compounds. This same compounding principle has now been applied to hard rubber type stocks with equal effectiveness. By employing the high styrene resin to promote a portion of the hardening and stiffening action in the hard rubber compound, it is possible to compound high hardness stocks at lower sulfur contents, which in many cases exhibit impact strengths far in excess of those obtained with conventional hard rubber stocks. The paper presents basic studies made in a GR-S hard rubber stock, and covers ranges from 0 to 100 parts of reinforcing resin per 100 parts of rubber, and sulfur ranges from 16 to 35 parts of sulfur per 100 parts of rubber.

In addition to the property improvements noted above, the resin incorporation produced physical improvements, most notable of which was the marked reduction in surface "orange peel" effect on pieces cured from the resin-bearing stocks. Also of note was the improvements in processing and preforming due to the reduced nerve and shrinkage of the resin stocks, and the reduced tendency for charring in thick sections when using the resin-reinforced stocks. Studies are also presented which show that good impact strength can be maintained in stocks of high pigment loading when using the high-styrene resin-lower sulfur type of hard rubber stock.

4:05 P. M.—7—Modern Vulcanization Processes. ***H. A. Freeman (Goodyear Tire & Rubber Co., Akron, Ohio).***

An outline of some of the methods used at just one rubber company is enough to illustrate the intricacies of modern curing. Different types of rubber goods require different techniques in that final step in their manufacture—vulcanization. A review of 10 classes of products includes: (1) Sheet Rubber, (2) Frothed Rubber, (3) Inflated Rubber Products, (4) Belts, (5) Heels, Soles and Molded Goods, (6) Hose, (7) Hard Rubber, (8) Fuel Cells, and (9) Tubes. General methods of tire curing are cited but breadth of this field prevents detailed presentation. To these rubber products are specifically applied 26 distinctly different methods of vulcanization. For example, the cure of Frothed Rubber is accomplished by (A) Steam Jet Tunnel, (B) Boiling Water, or (C) Electronic High Frequency. Belts are cured (A) In Long Platen Press with "Cold Ends", (B) Rotocure, (C) Wrap Cure, or (D) Reverse Cure. A brief resume of each process stresses its distinctive feature in this parade of modern curing.

4:30 P. M.—8—Variables in the Compounding of Resin Acid-Rubber Masterbatches. ***J. F. Svetlik and R. S. Hanmer (Phillips Petroleum Co., Bartlesville, Okla.).***

Variations in the oxide loadings of rubber compounds made from resin acid-rubber masterbatches show that optimum properties can be obtained at or near the stoichiometric equivalent point of the naturalization of the resin acid by the oxide. There are indications that considerably higher amounts of resin acid than originally thought possible can be tolerated in these masterbatches if high loadings of oxide are employed. Blooming of the resin acid in cured vulcanizates, a considerable problem when conventional quantities of oxide are employed, can be minimized by using higher loadings of oxide.

Thursday Morning—March 19

9:00 A. M.—9—Derivatives of Chlorosulfonated Polyethylene and Their Infrared Spectra. ***M. A. Smook, E. T. Pieski, and C. F. Hammer (Polychemicals Department, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.). (Paper will be presented by Mr. Smook).***

The chemical reactions which take place during the vulcanization of most elastomers have never been completely understood. Vulcanization is a complex process, and the large number of reactive sites in the common elastomers encourage side reactions in addition to crosslinking. Chlorosulfonated polyethylene has comparatively few reactive sites, and it was hoped that infrared techniques would provide a method of following the reactions of the material.

Through the synthesis of model compounds and the identifications of their infrared bands, band assignments have been made for the aliphatic sulfonyl chloride group. The reactions of chlorosulfonated polyethylene with amines, alcohols and inorganic bases have been followed by means of infrared. The sensitivity of the molecule to water during these reactions was demonstrated, and the effect of heat on the stability of the sulfonyl chloride group was shown. A clear picture of the mechanism of some of the crosslinking reactions of chlorosulfonated polyethylene can be obtained from this work. In addition, infrared band assignments have been made for the first time for a number of derivatives of aliphatic sulfonic acids.

9:25 A. M.—10—Chemical Resistance of Chlorosulfonated Polyethylene. ***R. T. Currin (Polychemicals Department, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.).***

Chlorosulfonated polyethylene offers exceptional resistance to chemical and solvent action, to the effects of oxidizing agents, and to absorption of liquids. The complete chemical saturation of chlorosulfonated polyethylene along with its

chlorine content has given a polymer demonstrated to have outstanding resistance to ozone and oxygen. Because of this resistance the elastomer was expected to be relatively inert to most chemical attack.

Tests reported in this paper were limited to classes of chemicals which were known to be severe in their action on elastomers. Chemicals used included strong oxidizing acids, concentrated mineral acids, refrigerants and oils. In strong oxidizing media chlorosulfonated polyethylene maintained an excellent surface and good tensile properties. Chlorosulfonated polyethylene even maintained its flexibility without increasing in stiffness after exposure to concentrated mineral acids.

The effects of compounding variables on chlorosulfonated polyethylene were studied. In general, the type and amount of filler did not change the chemical resistance; however, the curing system proved to be important. Chemical attack on elastomers is aggravated at higher temperatures, and this effect of temperature on chlorosulfonated polyethylene is discussed. The improved chemical resistance of blends of chlorosulfonated polyethylene with other elastomers is also discussed.

9:50 A. M.—11—Statistical Methods in Compounding Chlorosulfonated Polyethylene. ***W. L. Gore (Polychemicals Department, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.).***

Experiments in rubber compounding are unusally complex and a very large number of experimental combinations are often explored in the investigation of new formulations. This number can be reduced materially by applying modern scientific methods in designing the experiments. The relationships between the conventional designs, the factorial, and the Latin Square are explained. An example is given of a half replicate factorial design used in exploring the cure system of a blend of chlorosulfonated polyethylene with natural rubber. In this example the number of experiments was reduced from 54 in the original plan to 8 in the half replicate factorial.

10:10 A. M.—12—Influence of Various Weathering Factors on Ozone Cracking of Natural and Synthetic Rubbers. ***W. G. Mayes (Chemical and Physical Research Laboratories, Firestone Tire & Rubber Co., Akron, Ohio).***

A study has been made of the relationship between the depth of ozone attack and such variables as (1) ozone exposure temperature, (2) type of rubber compound, (3) type and extent of elongation, (4) wax content of the stock, (5) ozone concentration, (6) time of ozone exposure, (7) the amount of light during ozone exposure, and (8) state of cure.

In a comparison of the ozone resistivities of compounds based on several commercial polymers, the following order of decreasing resistivity was found: (1) Butyl rubber, (2) neoprene, (3) Butaprene NSP-98, (4) Hevea, and (5) GR-S. This order of resistivity was found to hold over the temperature range of —20°C. to +60°C.

In a study of the influence of ozone exposure temperature on the depth of ozone attack (at an ozone concentration of 25 pphm) it was found that, in the range from —20°C. to +60°C, the most severe ozone attack took place at 40°C.

The presence of 2 percent wax in Hevea or GR-S was found to afford no protection against ozone attack at temperatures of 40°C. or higher, presumably because the wax becomes soluble in the compound at these temperatures. Light was found to decrease the extent of ozone attack on a compound under either static or dynamic elongation.

Depth of ozone attack is a minimum at optimum cure. Ozone attack and the molecular weight between cross-links were found to be linearly related—the lower the molecular weight between cross-links, the shallower the ozone cracks.

10:35 A. M.—13—Ozone Formation in the Photochemical Oxidation of Organic Substances. ***A. J. Haagen-Smit and C. E. Bradley (California Institute of Technology, Pasadena, Calif.), and M. M. Fox (Los Angeles County Air Pollution Control District, Los Angeles, Calif.).***

Concentrations of ozone have been measured in the Los Angeles area which are ten times higher than those found normally. Ozone formation through the photochemical dissociation of nitrogen oxides is greatly enhanced by the presence of small amounts of hydrocarbons and their oxidation products. It is postulated that peroxide radicals are formed in the photochemical oxidation of these substances with nitrogen oxides, which then react with molecular oxygen to form ozone.

Substances such as biacetyl, bibutyryl and pyruvic acid, which readily form radicals upon irradiation with sunlight, yield ozone in the absence of nitrogen oxides. The ozone formed was identified by chemical and physiological methods.

Since the concentrations of nitrogen oxides and hydrocarbons used in these experiments are similar to those found in the Los Angeles area, the occurrence of abnormally high ozone concentrations is readily explained. The high ozone concentration and excessive rubber cracking observed in this area is therefore caused by the same agents which are responsible for crop damage, eye irritation, haze and smell, namely, nitrogen oxides and hydrocarbons and their oxidation products. These findings should be considered in planning rubber storage facilities.

Since the concentration of ozone formed in this manner is several times higher than the limit of 0.1 p.p.m. set by the Council on Physical Therapy of the American Medical Association for safe working conditions, the uncontrolled release of these chemicals should receive serious consideration.

11:00 A. M.—14—The Structure of Neoprene. VI. Crystallization. ***J. T. Maynard and W. E. Mochel (Chemical Department, Experimental Station, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.). (Paper will be presented by Mr. Maynard).***

A volume dilatometric study of the crystallization behavior of neoprenes made at —40°C., 10°C., and 40°C. has shown that the melting point of the crystalline phase in these polymers is an inverse linear function of polymerization temperature. Polychloroprene made at —40°C. melts at ca. 65°C., while conventional 40°C. neoprenes melt at ca. 40°C. Comparison of this data with the melting point depression observed in a chloroprene-methacrylonitrile copolymer and in polychloroprene-diluent mixtures has made possible calculations which confirm earlier hypotheses that neoprenes have a highly regular structure. Commercial neoprenes made at 40°C. are calculated to consist of 80-85% of the *trans*-2-chloro-2-butenylene units which result from *trans*-1,4 polymerization of chloroprene.

Densities determined for crystalline and amorphous neoprenes have been used to calculate the degree of crystallinity of these polymers, and this information has made possible calibration of the infrared crystallization-sensitive bands, for use in measurement of degree of crystallinity. The heat of fusion of the crystalline phase of neoprenes has been found from diluent data to be 22.7 ± 2 calories per gram.

11:30 A. M.—15—Program in Rubber Technology at the University of Southern California. ***Robert E. Vivian and Joseph S. Smatko (University of Southern California, Los Angeles, Calif.). (Paper will be presented by Dr. Vivian).***

Since 1934, the Chemical Engineering Department of the University of Southern California has been offering courses in Rubber Technology in the evening for men from the local rubber industry. During World War II, the university expanded these courses to train many chemists for the new synthetic rubber plants being built in the Los Angeles area.

The Los Angeles Rubber Group, Inc., has recently decided to support the establishment of a complete program in Rubber Technology on the campus of the university, and it has raised a fund of $100,000 for this purpose. Equipment for a modern rubber laboratory is being secured and installed. Dr. Harry L. Fisher has agreed to become the first director of the program, assuming this position February 1, 1953.

Dr. David Spence has donated his valuable library of periodicals and books on rubber to the university. It includes

several rare first editions. In addition, he has given $5,000 for the maintenance and expansion of the library collection.

Two undergraduate courses in Rubber Technology were offered last semester and they are being given now, including one graduate course by Dr. Fisher. The laboratory courses will begin next fall, when the equipment will be ready. It is planned to offer the work largely in the evening for men from the rubber industry as well as for the regular daytime students in Chemical Engineering and Chemistry who wish to enter the rubber industry.

Plans have been made for a degree of Bachelor of Engineering, with a major in Chemical Engineering (Rubber Option) and for a graduate program of education and research for the degree of Master of Science. These plans are being developed in cooperation with the Education Committee of Tlargi, in the endeavor to help meet the needs for highly qualified technical men by the growing rubber industry in the West.

Thursday Afternoon—March 19

2:00 P. M.—16—Powdered Reclaim. ***D. S. le Beau (Midwest Rubber Reclaiming Co., East St. Louis, Ill.).***

Laboratory data on a new kind of reclaim produced in powder form, free flowing and suitable for automatic handling will be discussed. A variety of these reclaim powders can be produced. They are usually, but not necessarily, prepared in pre-mix form. They will produce pliable coherent sheets immediately when subjected to mastication.

The present paper will discuss in greater detail some of these reclaim powders, in particular those containing carbon black. Analytical data seem to indicate that carbon black when present becomes adsorbed on the surface of the individual reclaim particle and is held there tightly afterwards. This takes place during the actual reclaiming process and results in effect in a predispersion of the carbon black. Coherent and pliable sheets are obtained from such reclaim powders, even if the added carbon black amounts to as much as 35% of the weight of the sheet. This predispersion seems to aid in processing and also seems reflected in the physical data of compounds prepared by the use of reclaim powders.

Data obtained from a laboratory type B Banbury show that mixing cycles can be shortened and batch sizes can be increased depending on the amount of reclaim powder used in the compound. Data on power consumption will be presented and data on the physical properties before and after aging, as well as chemical analyses, will be discussed.

The process permits the production of reclaim within a very wide range of plasticities, much wider than that possible by the use of conventional reclaiming equipment.

2:25 P. M.—17—A Simple Flexibility Test. ***Dietrich G. Stechert (Gates Rubber Co., Denver, Colo.).***

For some time there has been a need for a flexibility test which is simple, but at the same time meaningful, for rubber and plastic products. Numerous tests have been proposed in the past. These include simple beam and cantilever type tests and various modifications. Generally these are considered to be small deflection tests.

The flexibility of rubber and plastic products depends on the curvature to which they are bent. If the flexibility of belting or hose, for example, is needed for design or development purposes it should be measured at the desired degree of curvature.

The proposed test consists of the measurement of a distance and a force, using a simple, inexpensive piece of equipment, which can be home-made. A quick calculation yields the flexural rigidity, a standard measure of flexibility in the study of the strength of materials. Although the test equipment is simple, the test is sensitive to small variations in flexibility.

Because of the extreme simplicity of the equipment, technique, and calculation of flexural rigidity, it is suggested that the test be used wherever a quantitative measurement of the flexibility of rubber products or test pieces is needed. Thus, the method may be useful in research, development, design, and control work.

2:45 P. M.—18—Chemistry in Carbon Black Dispersion. ***Bernard C. Barton and George H. Ganzhorn (U. S. Rubber Co., Passaic, N. J.). (Paper will be presented by Mr. Barton).***

Heating rubber-carbon black mixtures at elevated temperatures results in vulcanizates with lower electrical conductivity, lower hysteresis, and lower durometer hardness. These changes are apparently the result of chemical reactions between carbon black and rubber which alter the dispersion of the carbon black. Data are presented which show that the basic factors effecting these changes are the chemical reactivities of the carbon black and the polymer and the time and temperature of treatment.

Maximum wear resistance is obtained only in stocks highly reinforced with carbon black of small particle size (15-40 μ). It is generally accepted that high hysteresis, relatively high durometer hardness, and increased electrical conductivity are associated with this reinforcement. Experimental evidence is presented which indicates that these physical properties can be changed more by the physical nature of the dispersion resulting from chemical reaction of black with rubber than by the physical properties of the individual particles of black. It will be shown that these changes can be made without affecting the so-called reinforcing properties of the black.

3:10 P. M.—19—The Ultimate Analyses of Carbon Blacks. I. ***Merton Studebaker (Phillips Chemical Co., Akron, Ohio).***

Very little accurate data are available in the literature on the ultimate analyses of carbon blacks. This paper presents analyses of a number of current commercial samples. It is shown that the various types of carbon black have characteristic analyses. The relationship between oxygen content, hydrogen content and surface area of various types of carbon black is discussed. A few properties of carbon blacks, which can be related to the ultimate analyses, are treated briefly.

3:30 P. M.—20—The Ultimate Analyses of Carbon Blacks. II. ***Merton Studebaker (Phillips Chemical Co., Akron, Ohio).***

When carbon black is incorporated into rubber, the physical properties of the loaded stocks are dependent upon the type of carbon black used. In the first paper of this series, it was pointed out that the various types of carbon black are characterized by their ultimate composition (and other properties). The following rubber properties are treated with respect to the influence of oxygen content and hydrogen content of the carbon black used: modulus, Mooney viscosity, resistivity, and road wear.

3:50 P. M.—21—The Effect of Temperature on Thermal Conductivity Coefficient of Silicone Rubber Compounds. ***M. G. Etzwiler, R. M. Combs, and T. J. Sobol (Connecticut Hard Rubber Co., New Haven, Conn.). (Paper will be given by Mr. Sobol).***

The thermal conductivity coefficients of silicone rubber and other materials have been measured at various temperatures in the range of —65°F. to +350°F. Other materials examined include polychlorofluoroethylene, polytetrafluoroethylene and polychloroprene compounds. Materials studied were in the form of supported and unsupported films as well as molded sheets. The authors have included in this work the effect of oven aging on the thermal conductivity coefficient of the materials studied.

Thermal conductivity coefficients were measured by means of apparatus constructed to National Research Council specifications as modified by the University of Minnesota. Tests were performed in accordance with ASTM Standard Method C-177-45 and were conducted at the laboratories of the Connecticut Hard Rubber Company.

Editorials . . . . . .

Picture for 1953

TOP experts are in agreement that barring unforeseen developments the year 1953 should prove a banner period for the rubber manufacturing industry, with all segments of the field reaching heretofore unrecorded heights. This optimism is based on the general feeling that the business tempo will be increased substantially as a result of the first Republican Administration in twenty years plus the accelerating tempo of rubber goods production in the final quarter of 1952.

The experts agree that an all-time new rubber consumption mark will be reached this year, with estimates ranging from 1,290,000 long tons to 1,300,000 tons. The forecasts indicate that total civilian tire sales for the year—still the consumption barometer—will run from 97,000,000 to 100,000,000 units, of which approximately 49,000,000 will be replacement tire units. Since the automobile manufacturing industry is setting its own sights for a record year, sales of original equipment tires will take a substantial jump as well. Non-transportation products accounted for some 350,000 long tons of new rubber in 1952, and an increase of approximately 10% to 385,000 tons is anticipated during the coming year.

The statisticians are also in agreement that, barring a new war, rubber usage in military products will decline slightly due to the tapering off in the rearmament program, but that increased civilian consumption will more than account for this decline. Since the general level of industry activity will be pointed upward, particularly for the first two or three quarters of the year, production of belting, packing, hose, tape, and other industrial products will be maintained at current or even expanded levels.

For those who enjoy seeing big figures, the National Securities Research Corporation, sponsors and managers of a group of mutual investment trusts, has predicted that net earnings of all United States corporations will rise to $18,500,000,000 in 1953, as compared to estimated earnings of about $17,500,000,000 for 1952, an increase of one billion dollars. Dividends are expected to rise to a new peak of $9,500,000,000, as compared with $9,000,000,000 attained in 1950 and 1951, and believed equalled in 1952. Profit margins, on the whole, should be substantially increased, according to the forecast. It is a comforting thought to realize the rubber manufacturing industry contributes in no small measure to these figures.

Synthetic Costs

IN VIEW of the approaching decision with regard to the disposal of the government-owned synthetic rubber producing facilities to private industry, the survey of synthetic rubber costs by Howard H. Heilman, consulting chemical engineer, in the current edition of *Natural Rubber News*, the monthly newsletter issued by the Natural Rubber Bureau of Washington, D. C., is particularly topical. Observations are presented by Mr. Heilman for both the immediate and long term future, with the latter represented by a target date of 1960.

Space does not permit inclusion of the reasoning by which Mr. Heilman reached his conclusions, nor a discussion of the numerous variables which must be considered in arriving at such conclusions, but a reading of the report is indicative of the fact that the author is well aware of the pitfalls involved in forecasting long term prices. Based on all the considerations involved, Mr. Heilman believes that the long term future selling price for synthetic rubber will be within the broad range of 25 to 30c per pound, depending on total annual demand. Regardless of the exact value obtained for the plants on disposal, he believes this price range would be required due to the gradual obsolescence, rehabilitation cost, and replacement investments necessary.

Taking into consideration the possible large scale development in the oil-extended and oil-masterbatched synthetic rubbers, Mr. Heilman states that such rubbers will sell in the range of 3 to 5c less per pound than the standard cold synthetic rubber, depending upon the proportion of oil used. Or, in other words, the prices of oil-extended synthetic rubber would range from 20 to 26c per pound. Since the development of these extended polymers is of prime importance to the economics and technology of the industry, and since major use of these polymers is indicated, Mr. Heilman states that the use pattern merits careful study to determine the magnitude of its final effect upon the whole price structure for synthetic rubber.

As indicated above, there are many variables involved in forecasting future selling prices of general-purpose synthetic rubbers, particularly the long term costs of butadiene and styrene. On one point, however, Mr. Heilman need have no qualms, namely, that annual consumption of synthetic rubber in the long term will be well over 500,000 long tons and considerably closer to 700,000 tons.

NEWS OF THE MONTH

RFC REACTIVATES TWO ALCOHOL-BUTADIENE LINES AND RELEASES STATEMENT OF 1952 FISCAL YEAR

HARRY A. McDONALD, Administrator of the Reconstruction Finance Corporation, on December 10, 1952, ordered the reactivation of two alcohol-butadiene lines at its plant at Louisville, Ky. The action was taken as a result of advice from the rubber industry that requirements have grown beyond levels previously contemplated and that there will be a continuing need for more new rubber throughout 1953. RFC has also released its statutory report on operations of the synthetic rubber program for the 1951-52 fiscal year as required by the legislation under which the program is conducted. The government agency reported a net profit of $16,113,542 in fiscal 1952. A complete breakdown of the financial aspects of the synthetic rubber program appears on the following page.

The partial reopening of the Louisville plant is expected to provide enough butadiene to make possible production of an additional 5,500 long tons of synthetic rubber each month. The first of the reactivated lines at Louisville was expected to be in operation within 35 to 45 days from December 10, and the second one within 30 days more.

Two alcohol lines at the RFC plant at Kobuta, Penna., also ordered into production recently, were expected to be turning out butadiene in late December and early January, 1953. The Kobuta plant is operated for the RFC by the Koppers Co., while the Louisville installation is operated by the Union Carbide and Carbon Corp. Their alcohol lines had been closed down on the basis of industry estimates for which the production of petroleum-based synthetic rubber facilities would have been adequate.

First Quarter Requirements

Rubber industry executives recently estimated at 163,373 long tons their requirements of GR-S for the first quarter of 1953, but have now advised the Office of Synthetic Rubber that the figure must be revised upward. Despite this increased demand, however, RFC has assured the industry that it will be able to meet presently foreseen requirements for GR-S and Butyl rubber, as it has in the past.

To provide additional alcohol for the reopened butadiene lines, RFC, on December 30, 1952, announced that it will receive quotations for approximately 15,000,000 gallons of alcohol. Quotations were to be received by the Office of Synthetic Rubber until 5:30 P.M., E.S.T., January 12, 1953, for the furnishing of all or any part over 100,000 gallons of the alcohol for delivery at the rate of approximately 5,000,000 gallons per month during February, March and April, 1953.

On December 23, 1953, RFC took another step to increase the total quantity of GR-S produced in its copolymer plants. Effective January 1, 1953, all cold GR-S, except the oil-extended polymers and the arctic polymers GR-S 1504 and GR-S 1505, will be produced to a bound styrene content of 23.5%, plus or minus 1%, instead of the present 20%, plus or minus 1%. This change, said RFC, affects only GR-S 1500, 1501, 1502, 1600 and 1601.

Another interesting announcement came from the B. F. Goodrich Co., which reported the development of a new, lower-cost process which makes cold rubber 50 times faster than current methods. The new method of making cold rubber cannot be used in existing plants because of insurmountable technical problems, the company stated, adding that this raises the question of the possible obsolescence of present facilities.

The process, still in the pilot plant stage, does not add to the quality of regular cold rubber, but produces the material in 15 to 20 minutes, compared with 10 to 12 hours required by present production methods. Under the new process, the rubber is made in stainless steel pipes rather than in expensive pressure vehicles used in present plants, the company said.

John L. Collyer, president of the company, reported that the small size and the simplicity of construction for the new process eliminates the need for much expensive equipment and reduces the size of the building required to house the rubber-producing operations. Company engineers estimate that the cost of buildings and equipment could be reduced by at least 50% by the new process.

The new continuous pipeline is made possible by the development of extremely active catalysts which substantially speed up the chemical reaction needed. The process is the result of 12 years of research by Goodrich scientists and was perfected under a research contract financed by RFC.

Other news of interest to the rubber industry came from the National Production authority which, on December 11, 1952, amended its Order M-2 to relax the requirements for reporting rubber consumption and stocks. The order now requires that only those persons consuming, or having in stock, rubber equal to or in excess of certain specified amounts need file a report on Form NPAF-3. It also requires that persons consuming less than the minimum amounts file annual reports only on NPAF-4.

Working Party in Meeting

Delegates of the major rubber producing and consuming countries opened talks in London, England, on January 5, 1953, in search of a formula for stabilizing natural rubber prices and supplies. The delegates, meeting as the "working party" of the International Rubber Study Group, will try to draft an agreement between the producing and consuming countries for presentation to the group's next plenary conference in Copenhagen next May.

Informed sources said the London meeting will consider a proposal for creation in consumer countries of buffer stocks of natural rubber. These stocks would be held separate from governmental strategic stockpiles and would be designed primarily to keep supplies and prices in balance.

Any agreements arrived at in London and approved at the Copenhagen meeting would be submitted to an International Plenary Conference empowered to make decisions. The Copenhagen meeting has been scheduled for May to allow the new administration in the United States enough time to develop and express its views on the projected reorganization of the Western rubber markets.

In commenting on the general situation as regards natural rubber, John L. Collyer warned that price increases of 20 to 25% for natural rubber will result in decreased use of that material by rubber products manufacturers in the United States. He pointed out that since the middle of October the price of top grade natural rubber has increased more than five cents a pound making natural rubber cost more than 30c a pound compared with GR-S at 23c a pound.

As has happened in the past, he said, natural rubber producers may price themselves out of the United States market. Synthetic rubber, he noted, which is equal or better than natural for a majority of uses, will be consumed in increasing amounts. He emphasized that the United States is no longer dependent on imported natural rubber and this raw material will only be purchased when it is competitive in value with America's synthetic product.

Raises China Shipments

Ceylon announced on November 13 that she was stepping up her shipments of rubber to Communist China. A Ceylonese delegation was expected to arrive in Peiping a short time ago to conclude a major trade pact. It was said that Ceylon had agreed to sell 50,000 tons of sheet rubber annually for five years to China at an initial price of 37c a pound—approximately 10c a pound above present world prices. The sale represents almost 50% of Ceylon's annual rubber production.

On the other hand, the president of the British Board of Trade recently reported that Communist China had received no rubber from Great Britain or its colonies this year. He added that Russia is getting British controlled rubber at the same rate as previously. British policy on shipments of rubber to Russia is to limit the amount to what the Board of Trade deems normal civilian needs. Rubber authorities in the U. S. estimate that this works out to about 80,000 tons a year.

Syndicated columnist David Lawrence, in commenting on the Ceylonese situation in a recent column, pointed out that a naval blockade on Ceylon may have to be put into effect to keep vitally-needed rubber from Red China. This, he suggested, may be a task for the new administration to handle.

Seek Tire Discount Curbs

Government attorneys indicated on December 11, 1952, that they may ask the Court of Appeals to allow the Federal Trade Commission's quantity discount limit on tires to take effect immediately. The FTC was ordered on December 10 not to enforce its order pending the outcome of an industry appeal to have it nullified.

It was recently disclosed that the FTC had voted to oppose in the Court of Appeals any order staying its ruling more than "five or ten days." A Federal District Court Judge had previously thrown out industry motions to nullify the FTC ruling, stating that he lacked jurisdiction.

The National Federation of Independent Business on December 11 urged the Attorney General of the United States to vacate the stay on the FTC order granted by the Federal District Court Judge. The business group also asked the FTC to urge the Attorney General to do this. However, a commission meeting is necessary to decide on any action.

The FTC ruling was issued last January and was to have taken effect last April. It was referred by the court pending a decision on the industry motion to kill the ruling. The ruling itself would sharply limit quantity discounts granted by tire manufacturers to dealers. The FTC found present discounts impaired competition and promoted monopoly.

RFC Statement of Operations of Synthetic Rubber Program

Fiscal Year Ended June 30, 1952

Income:	
Sales of synthetic rubber	$415,932,537
Revenue from tank car operations	181,525
Other income	444,107
	416,558,169
Operating Costs and Expenses:	
Cost of rubber sold:	
Cost of production:	
Cost of materials consumed	291,054,410
Processing costs	60,769,790
	351,824,200
Inventory of finished rubber at beginning of period	12,278,086
	364,102,286
Less:	
Inventory of finished rubber at end of period	32,969,068
Finished rubber consumed in research	8,513
Cost of rubber sold	331,124,705
Depreciation of operating plants and facilities (including $927,030 on leased facilities)	40,635,392
Research and development	6,939,476
Adjustment of raw material inventories at June 30, 1952 to the lower of cost or market	5,023,513
Storage and handling of finished goods	930,894
Administrative expense	2,391,765
Losses from fire and other casualties	1,383,451
Other expenses and losses	740,923
Total operating costs and expenses	389,170,119
Net Income from Operations	27,388,050
Interest on U. S. Government Funds Invested in Net Operating Assets	5,305,646
Provisions for Shutdown Expense	3,000,000
Reactivation Expense	1,982,158
Expenses for Maintenance and Protection of Standby Plants and Facilities (includes $850,123 depreciation on standby plants)	986,704
Net Profit	$ 16,113,542

Extends Chemical Coverage

The Office of Price Stabilization has extended coverage of the regulation authorizing sellers of chemicals to apply for permission to put into effect escalation clauses contained in long-term contracts entered into before the general price freeze of 1951. The action was taken in Amendment 3 to General Overriding Regulation 27, effective December 24, 1952.

The agency made clear that GOR 27 is applicable only to long-term contracts which authorize a seller to increase his selling price to offset increases in his costs. As amended, the regulation specifies that ceiling price adjustments will be limited to cases involving changes in costs incurred by the seller in fulfillment of a long-term contract. The action makes GOR 27 applicable to all chemicals. Chemicals previously covered by the regulation were limited to catalysts used in petroleum cracking processes, ethyl chloride, synthetic ethyl and isopropyl alcohols, and rare earth oxides and fluorides. Not included under GOR 27, as amended, are paints, varnishes, lacquers, animal and vegetable oils, drugs, cosmetics and soaps.

GOR 27 authorizes a seller to apply for permission to substitute the pricing provisions of pre-freeze long-term contracts for his existing ceiling prices. The resulting ceiling prices are applicable, however, only to buyers who are parties to such contracts. Another restriction specifies that the adjusted ceiling price may not be higher than the general level of ceiling prices for the commodity and may not be made the basis for subsequent increases in the ceiling price of any other commodity.

INDUSTRY LEADERS IN ACCORD ON 1953 AS ANOTHER RECORD YEAR

Top rubber industry executives, in their annual year-end statements, seem to be in agreement in predicting that 1953 may be another record year for the rubber industry. The opinion was expressed by H. E. Humphreys, Jr., president of the U. S. Rubber Co., that all indications point to a volume of sales and production during the first half of 1953 which would more than offset any decline that might occur in the last half of that year. John L. Collyer, president of the B. F. Goodrich Co., opined that the rubber manufacturing industry in 1953 may have its best year in history, and was joined in this belief by many other industry leaders.

P. W. Litchfield, chairman of the board of the Goodyear Tire & Rubber Co., anticipates a greater volume for the industry in 1953 than was scored in 1952, while Harvey S. Firestone, Jr., chairman of the board of the Firestone Tire & Rubber Co., foresees a record consumption of rubber in the new year. E. J. Thomas, president of Goodyear, puts rubber consumption in 1953 at approximately 1,288,000 long tons.

As for specific items, it is generally predicted that total civilian tire sales for the year will run from 97,000,000 to 100,000,000 units. The nation's replacement passenger car tire needs are estimated at about 49,000,000 units, or some 3,000,000 more than in 1952.

Non-Tire Segment of Industry

Thomas Robins, Jr., president of Hewitt-Robins Inc., stated that the non-tire segment of the industry likewise looks forward to a good year in 1953, with production equalling 1952 levels and possibly increasing by as much as 10%. Mr. Robins stated that companies making rubber products other than tires consumed approximately 350,000 tons of rubber in 1952, and present estimates indicate that 1953 consumption may rise to 385,000 tons or 32% of the industry total. Sales of foam rubber cushioning are expected to continue upward.

Barring a new war, rubber usage by the military will probably decline slightly due to a tapering off in the rearmament program. This decrease will be more than offset, however, by increased civilian consumption.

The consensus is that belting, packing and other industrial products will continue in strong demand following the general high level of industrial activity. Mr. Humphreys pointed out that some weakness was shown in this type of business during mid-1952 largely due to the steel strike. Volume increased greatly during the latter half of the year, however, and should continue at a high level well into 1953.

Mr. Firestone predicted that supplies of both natural and synthetic rubber will be sufficient to meet anticipated demands in 1953. Mr. Humphreys believes that supplies available may exceed the industry's ability to consume it, while Mr. Thomas called for a greater expansion of synthetic facilities, saying the United States will face a rubber shortage by 1960 unless this is done. Mr. Litchfield says that the entire world supply-demand picture on rubber will be operating on a perilously close margin a few years from now.

While many industry leaders were calling for an expansion of the synthetic rubber producing facilities, natural rubber producers were reported to be embarking on major expansion plans. Warren Lockwood, president of the Natural Rubber Bureau, stated that natural rubber production will not lag behind in meeting new consumption needs. Mr. Lockwood cited the rubber growers of Malaya who have begun a replanting program that involves millions of dollars. Seven years from now, he said, hundreds of thousands of acres will bear a fresh crop of high-yielding rubber trees ready to produce the increased tonnage that international rubber experts agree will be required in the years that lie ahead.

Expanding Uses for Rubber

Industry leaders pointed to the ever-expanding uses for rubber. Mr. Collyer stated that to meet the needs of our rising population, all private industry will need to spend about $200,000,000,000 for new plants and equipment in the decade of 1950-60.

Mr. Humphreys also pointed out that chemicals and plastics are becoming increasingly important to the rubber industry and hold the greatest promise for growth. U. S. Rubber, for example, expects a 25% increase in the sales of its Naugatuck Chemical Division during the next two years. This increase will probably be the greatest percentage-wise of any division of the company and will come principally in the sale of agricultural chemicals and resins for the plastics industry. B. F. Goodrich Chemical Co., a subsidiary of B. F. Goodrich, also pointed to its expanded plant capacity for the production of plastic raw materials.

John R. Hoover, president of Goodrich Chemical, emphasized the fact that rigid vinyls are finding ready acceptance in many fields. He said that the years ahead will present both an opportunity and a challenge for the chemical industry. George C. Miller, vice-president in charge of sales for the Bakelite Co., a division of the Union Carbide and Carbon Corp., opined that 1953 will be a good year for the plastics industry. Mr. Miller sees a projected expansion of about 20% for vinyls and polystyrene in 1953.

Vinyl Resins in Good Supply

Mr. Miller stated that vinyl resins for the production of calendered film and sheeting and general purpose molding and extrusion requirements are in good supply and are expected to continue to be so for some months to come. Polyvinyl acetate is also in good supply, but polyvinyl butyral may well be in short supply in the next few months, due largely to expanding automobile production and increasingly popular demand for safer vision, which means more laminated safety glass per car.

The Society of the Plastics Industry, Inc., estimates that production of all plastics raw materials will approximate 2,808,000,000 pounds in 1953, and that the dollar value of plastics products made from all plastics raw materials will approximate $1,485,000,000.

In all, the rubber manufacturing industry may be said to be looking toward a considerable expansion of business activity in the new year. Industry representatives are unanimously optimistic. Those rubber companies having chemical and/or plastics facilities expect that gains in these fields may even overlap gains in rubber itself.

Rubber companies are anxiously awaiting final disposal plans for the government's synthetic rubber plants. Privately owned synthetic facilities are generally being expanded as are vinyl resin and chemical plants.

The rubber industry seems to be uniformly hopeful that business conditions under the new administration will continue on the upgrade. Increased activity has been reported in the research and development field with new uses being sought for rubber. Subsidiary activities, such as better road programs and excursions into such fields as atomic energy, are also being pushed. The rubber industry continues to do its part in the defense program of the United States and looks forward to even greater contributions in 1953.

Technical Session on Rubber

Approximately 50 members and guests attended a special technical session on rubber held by the New York District of the American Society for Testing Materials at the Engineering Societies Building in New York City on December 8. Sherman R. Doner (Manhattan Rubber) was chairman and introduced the speakers. G. C. Maassen (Vanderbilt), the first speaker, outlined the history of Committee D-11 since its formation in 1912, itemized the specific functions of the numerous subcommittees, and discussed collaborative efforts with other technical groups, such as the S.A.E. and B.S.I. Gerald Reinsmith, of the Office of Chief of Ordnance of the Department of the Army, then delivered a talk on "Army Ordnance Rubber Goods." Making frequent use of slides, Mr. Reinsmith pointed out that Army Ordnance is concerned with 575 principal items and some 325,000 specialty items, many of which call for rubber in some manner, shape or form. He stressed the point that practically all rubber products must perform satisfactorily from —65° to 160° F., and showed numerous slides of packings, gaskets, seals, rings, tank tracks, bushings, etc. Tire testing methods used by Army Ordnance were described and some of the special studies inaugurated, such as that on the mechanism of aging, were discussed. The need for manufacturers to obtain security clearance before coming to Washington to discuss ordnance requirements was stressed by Mr. Reinsmith. Brief talks were also made at the meeting by Dr. Harold L. Maxwell (DuPont), society president, R. E. Painter, executive secretary, and G. O. Hiers, chairman of the New York District Council.

PLASTICIZER DRIP CONSIDERED AT UNDERWRITERS' CONFERENCE

On November 20, 1952, a joint meeting of the Industry Advisory Conferences for Wires and Cables and Nonmetallic-Sheathed Cable was held at the New York office of the Underwriters' Laboratories, Inc. No formal agenda had been prepared, but the meeting proceeded to discuss the subject of fluid discharge from thermoplastic compounds employed in wires and cables. The following is a general summary of the essential points which were brought out at the meeting.

The dripping of plasticizers in thermoplastic wires so as to stain finished surfaces, such as wallpaper in homes, is a problem which was first called to the Laboratories' attention about a year ago. A good many of the complaints were in connection with nonmetallic sheathed cable, which suggests that the trouble may be largely encountered in connection with cable assemblies rather than with individual thermoplastic-insulated wires. Thus far, most of the complaints have come from Philadelphia and points further south, which intimates that the higher temperatures encountered there may be a factor in connection with the problem.

The trouble with bleeding or exudation is by no means universal, that is, it has not been reported to the Laboratories from all sections of the country. It is not actually limited strictly to cable assemblies, for some of the trouble has been observed in connection with flexible cords and with building wire in conduit.

It was generally agreed at the conference that secondary plasticizers are the cause of the trouble which has been experienced with bleeding; that secondary plasticizers are not actually necessary; and that secondary plasticizers are generally used, because of their relatively lower cost, to reduce the over-all cost of the product.

Use of Secondary Plasticizers

It was the consensus that secondary plasticizers or extenders may be successfully employed, but that the essential thing to be watched in any case is the combination of materials involved. There are, altogether, an almost endless number of plasticizers and plasticizer combinations which may be employed in thermoplastic compounds, and it was pointed out that combinations of two or three—or perhaps even more—secondary plasticizers could be used. The opinion was expressed that a combination of at least 75% primary plasticizer with not more than 25% secondary plasticizer would work out all right.

It was also pointed out that, where a secondary plasticizer is used, a third material in contact with the compound might be the cause of exudation, and it was believed that scale wax is one such material which may contribute to the trouble.

The sentiment of the meeting was definitely in favor of not ruling out any specific material but to develop something in the way of a much needed test to determine whether a finished thermoplastic compound, as it leaves the factory, is likely to cause any bleeding trouble subsequently.

Although a test is really needed, it was the Laboratories feeling that no test should be made a part of the inspection work at the present time nor until something quite definite is known regarding the significance of a test.

It was stated that oven tests at 80° C. did produce dripping in cases where some unsatisfactory combinations of plasticizers were involved. However, judicious combinations of plasticizers gave no indication of trouble. The opinion was expressed that cyclic heating is necessary to determine the real basis of trouble with bleeding.

A test was briefly described involving temperature cycling within the range of 25 to 90° C. in about 30 minutes. Another simple heat test was described, one which was said to have had very satisfactory results. In this test, an infra-red heat lamp is directed at a vertically suspended sample at a distance of about a foot. The temperature attained on the sample, as determined by means of a thermometer, is approximately 55° C., although other tests have been conducted with temperatures within the range of 45 to 65° C. The time of application is 24 hours.

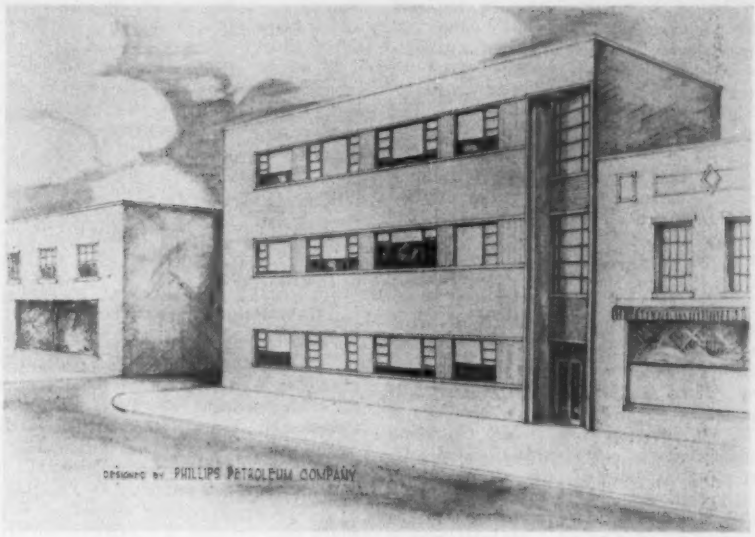
The bleeding of plasticizers under these conditions would indicate that trouble could be expected subsequently in the field. It was recommended that the various manufacturers try an infra-red lamp test and advise the Laboratories regarding the results obtained.

There was a question as to whether anything is needed in the way of a test to check the shelf life of thermoplastic insulation. Any such test would need to be correlated in some way to another test relating to bleeding.

The opinion was expressed that the industry has a two-part problem—one of which is related specifically to nonmetallic sheathed cable. The other part relates to building wire particularly and may include certain types of flexible cord.

The meeting felt quite strongly that the situation is serious enough so that all manufacturers of thermoplastic-insulated wires, cables and cords should give the subject careful consideration and strive to eliminate this trouble of exudation due to the inappropriate use of plasticizers.

PHILLIPS CHEMICAL CONSTRUCTING NEW OFFICE AND LABORATORY IN AKRON



Construction of a new office and laboratory building for the Philblack Sales Division of the Phillips Chemical Co. at 318 Water St., in Akron, Ohio, is now under way. Phillips Chemical is a wholly-owned subsidiary of the Phillips Petroleum Co. The new building will be approximately 55 by 75 feet in size and three stories high. The first floor of the building will be devoted to the Philblack customer service laboratory, now located at 330 Maiden Lane in Akron. The second floor will house Philblack sales personnel and a small laboratory for studies on the fundamental nature of carbon black. The third floor will be used mainly for mechanical equipment and additional office space as required. A parking lot will be provided at the rear of the building, which will be adequate for all Phillips employees.

Resigns From Fidelity Machine

Howard I. Green, vice-president and managing director of the Fidelity Machine Co., Inc., Philadelphia, Penna., has announced his resignation from that organization. His action coincided with the sale of his interests, which represented one of the largest blocks of Fidelity Machine stock. Mr. Green was a member of a syndicate which took over the company in 1946. He was particularly responsible for bringing the company to its present position in the development and manufacture of specialized equipment for the wire, rubber and textile industries. A graduate of the Wharton School of Finance and Commerce and former commanding officer of a PT boat in the Pacific during World War II, Mr. Green indicated that he would probably remain in the industry.

TECHNICAL PAPERS AND REPORTS FEATURE ASME RUBBER-PLASTICS MEETING

The presentation of twelve technical papers, including two special annual reports on the progress of rubbers and plastics, featured the annual meeting of the Rubber and Plastics Division of the American Society of Mechanical Engineers. The meeting was held at the Hotel Statler in New York City on December 4 and 5 in conjunction with the annual meeting of the parent society. It is estimated that approximately 150 members and guests attended the divisional meeting, which covered four separate technical sessions.

The first paper at the Rubber Session, held on the morning of December 4, was entitled "Hypalon S-2—A Durable, Versatile New Elastomer," which was presented by Alfred Stockfleth, Polychemicals Department, E. I. du Pont de Nemours & Co., Wilmington, Del. Mr. Stockfleth stated that this new chlorosulfonated polyethylene is one of the most durable elastomers yet developed and predicted that it will find wide application in the mechanical goods field. He said that it has outstanding resistance to abrasion, complete resistance to ozone, and excellent weathering properties. He also stressed its excellent heat resistance, which makes it useful at 250° F.

William M. Rand, Jr., of the Dewey and Almy Chemical Co., Cambridge, Mass., gave a paper on "The Properties, Application and Use of Flowed-In Gaskets" in which he described the materials used for flowed-in gaskets and the various methods of application of these materials which cover the full gamut of elastomeric materials. According to the author, by flowing liquid gasket materials into place and subsequently baking the compounds to solid films, economies of material and application labor are possible. He described in considerable detail the equipment required for the application of flowed-in gaskets and cited numerous instances where specific savings were accrued. (EDITOR'S NOTE: Mr. Rand's paper is reproduced in full elsewhere in this issue.)

Room Temperature Compounds

The final paper at this session was on the "Room Temperature Compound Process," delivered by A. N. Gray of the Western Electric Co., Baltimore, Maryland. Mr. Gray traced the work of Western Electric engineers over a 15-year period in developing the use of room temperature compounds to feed the extruding machines used in wire insulation work. He emphasized the fact that this process is not to be confused with the much publicized cold rubber, but rather is the practice of feeding extruders with compounds which have been mixed in the usual way, immediately cooled, and held until needed at the extruder.

The step-by-step progress which eventually led to the development of extruder screws which permit the successful operation of the room temperature compound process was traced by Mr. Gray through a series of slides. The screw which finally evolved was one with a tapered root, having the deepest section of the flight at the feed hopper and tapering gradually to a very shallow screw depth at the discharge end. The numerous advantages of the new process over former methods were outlined by the speaker. (EDITOR'S NOTE: Mr. Gray's paper will be reproduced in full in an early issue of RUBBER AGE.)

R. H. Gerke, of the U. S. Rubber Co., Passaic, N. J., acted as chairman at this morning session, with G. C. Maassen, of the R. T. Vanderbilt Co., New York, as vice-chairman.

Measurement of Tread Wear

Three papers were also presented at the second session, held on the afternoon of December 4. The first of these was on the "Measurement of Tread Wear of Commercial Tires," prepared by R. D. Stiehler, G. G. Richey and J. Mandel, of the National Bureau of Standards, Washington, D. C., and presented by Dr. Stiehler. The paper covered studies at NBS which have resulted in a marked improvement in the precision and reliability of measurements.

According to the authors, the three principal elements in the technique responsible for the improvement are: (1) A statistical design of test which will compensate for inequality of wear on different wheels; (2) The measurement of tread wear by differential weighings; (3) The geometric averaging of the rates of wear. The detailed procedures were described and a comparison given of the weight and depth-of-grooves methods for determining tread wear in three road tests recently conducted. The results indicated that reliable estimates of tread life can be made from 4000 to 6000 miles of road test using the newly developed techniques. (EDITOR'S NOTE: This paper will be reproduced in full in an early issue of RUBBER AGE.)

An interesting report on "Creep of Neoprene in Shear under Static Conditions: Ten Years" was presented by W. Newlin Keen, Rubber Chemicals Division, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., at this session. An interim report on these tests was made by Mr. Keen back in 1945 (*ASME Transactions*, April, 1946) which showed how the creep in shear of neoprene vulcanizates in the hardness range of 40 to 60 durometer is influenced by degree of vulcanization, preconditioning in shear at elevated temperatures, and change in composition. The extended tests confirmed the earlier findings, namely, that neoprene vulcanizates can be designed to have resistance to creep equal to or better than that of natural rubber. One neoprene specimen showed outstanding performance over a range of temperatures.

The current paper was also extended to include some data on the effect of natural aging for the approximately 11-year period on some of the mechanical properties of the neoprene vulcanizates involved in the tests. The effect of changes in test temperature on some of the vulcanizates was also outlined by the speaker.

The concluding paper at this session was a report on "Engineering Developments of Rubber: 1951-52," prepared by Leora Straka, Librarian, Goodyear Tire & Rubber Co., Akron, Ohio, and Betty Jo Clinebell, Librarian, Rubber Division Library, Akron, Ohio. This report, a survey of developments in rubber during the period from July, 1951, to June, 1952, was presented by Dr. B. S. Garvey, Jr., of Sharples Chemicals Inc., Wayne, Penna., chairman of the Library Committee of the ACS Division of Rubber Chemistry. (EDITOR'S NOTE: This report is reproduced in full elsewhere in this issue.)

F. S. Conover and John Carnish, both of the Manhattan Rubber Division of Raybestos-Manhattan, Inc., Passaic, N. J., acted as chairman and vice-chairman, respectively, at this session.

Papers at Plastics Sessions

Sessions on plastics were held on the morning and afternoon of December 5. James M. Church, of Columbia University, New York, and Bryce Maxwell, of Princeton University, Princeton, N. J., acted as chairman and vice-chairman at the morning session, and H. F. Wakefield, of the Bakelite Corp., New York, and Ray Platow, of the U. S. Plywood Corp., New York, presided as chairman and vice-chairman at the afternoon session.

Results of a survey of the data available on the relative merits of solid and laminated acrylic aircraft glazing were given in a paper on "A Comparison of Solid and Laminated Transparent Acrylic Enclosures for Aircraft," prepared by Gordon M. Kline and Benjamin M. Axilrod, of the National Bureau of Standards, Washington, D. C., and presented by Dr. Kline. Comparisons were made on several properties of the materials.

"Stress Crazing of Plastics" was the title of a paper prepared by J. A. Sauer and C. C. Hsiao, of Pennsylvania State College, State College, Penna. Presented by Dr. Hsiao, this paper reviewed the effect of various factors on the inception and growth of crazing and described some of the similarities between crazing in plastics, exposure cracking in rubber, and stress cracking in metals. Various examples of stress crazing in transparent plastics were presented.

Gerald D. Gilmore and Gordon B. Thayer, of the Dow Chemical Co., Midland, Mich., were the authors of a paper on "Some Design Considerations for Injection Molding Heating Chambers," which was presented by Mr. Thayer. The available theoretical, experimental and practical information concerning the behavior of plastic materials under high pressures in granular and fluid conditions was considered, and the information combined into a systematic approach to the geometrical problems of the design of injection molding heating chambers.

The effects of several types of defects on strength properties of sandwich constructions were covered in a paper on "The Effects of Defects on Strength of Aircraft Type Sandwich Panels" by Bruce George Heebink and A. A. Mohaupt, of the Forest Products Laboratory, Department of Agriculture, Madison, Wisc. It

was indicated that poor bonds in sandwich constructions reduce the flatwise tensile strength more than the bending and edgewise compressive strength, while unbonded areas from one to three inches in diameter cause reductions in the edgewise compressive strength of specimens 6 inches wide.

In the manufacture of plasticized polyvinyl chloride products, the use of powdered lead compounds creates a health hazard that has been difficult to control effectively, according to a paper on "The Effective Control of Lead Dust in the Manufacture of Vinyl Plastics." Prepared by Alexander E. Goss, Department of Health, State of Connecticut, Hartford, Conn., and Arthur M. Ross, Ross & Roberts, Inc., Stratford, Conn., and delivered by Mr. Goss, the paper, as indicated by its title, covered a new method of manufacture which provides the basis of maximum control of the dust hazard with a minimum of exhaust ventilation.

The final paper was on "Selected Plastic References for the Mechanical Engineer: July, 1951, June, 1952." This report was prepared by Helen G. Dikeman and A. K. Schmieder, of the Plastics Division, Monsanto Chemical Co., Springfield, Mass., and was presented by H. W. Mohrman of the same company.

Division Officers Elected

The meeting also featured an election of officers for 1953. M. E. Lerner (RUBBER AGE) was named chairman of the division and A. G. Gifford (Lord Manufacturing) was elected secretary. Other officers of the Executive Committee include G. B. Thayer (Dow Chemical), R. G. Seaman (*India Rubber World*), and F. H. Wehmer (Minnesota Mining). Members of the Advisory Committee include J. F. Downie Smith (Iowa State College), D. H. Cornell (Goodrich Research Center), F. W. Warner (General Electric), W. N. Keen (DuPont), and G. W. Neely (Richardson Co.).

Mr. Cornell was reappointed as representative on the Professional Divisions Committee, Mr. Seaman as publicity chairman, and Mr. Thayer as chairman of the Plastics Papers Committee. E. F. "Tom" Riesing, of the Inland Manufacturing Division, General Motors Corp., Dayton, Ohio, was appointed chairman of the Rubber Papers Committee, succeeding E. G. Cunningham (Precision Rubber Products).

The next meeting of the Rubber and Plastics Division will be held at Columbus, Ohio, on April 28-29 or 29-30. This meeting will feature two sessions on plastics and one on rubber. The rubber session will feature a Symposium on Molds and Molding. Further details on the Columbus meeting will be revealed in the near future.

ALCO OIL AND CHEMICAL ANNOUNCES THREE NEW SALES APPOINTMENTS

F. M. Tolin C. E. Cain J. P. Seguin

Alco Oil & Chemical Corp., Philadelphia, Penna., has announced three important sales appointments. F. McCawley Tolin has been named director of sales, while C. E. Cain has been appointed head of the Sales Service Division. John P. Seguin has been appointed technical sales representative for the New England States. Mr. Tolin joined Alco Oil in 1950. While attending Georgia Tech, where he majored in chemical engineering, Mr. Tolin was associated with the Rayon Division of E. I. du Pont de Nemours & Co., Inc., at Old Hickory, Tenn., as a control chemist and in their production training course. In the latter part of 1938, he joined the Safetex Corp., Port Chester, N. Y., as plant manager. In December, 1939, Mr. Tolin joined the R. T. Vanderbilt Co. Here, he worked in the Research and Development Latex Department, and then as technical sales representative.

Mr. Cain attended the University of Oklahoma where he received his B. S. degree in chemical engineering in 1941. He served on active duty with the U. S. Navy from 1941 to 1946 when he joined the Firestone Tire & Rubber Co. as a process control engineer. He then served as a development compounder, and finally as a sales and technical service engineer. In January, 1951, Mr. Cain joined the Toyad Corp., where he remained until November 1, 1952, when he joined Alco Oil.

Mr. Seguin attended the University of Michigan and received his master's degree in colloid chemistry in 1937. From 1937 to 1939 he was associated with the Research Division of the Diamond Alkali Co. From 1939 to 1943 he was connected with the Kansas City Limeolith Co. as manager and director of research. From 1943 to December 1, 1952, he was associated with the Xylos Division of the Firestone Tire & Rubber Co., first in research and development, and then as technical sales representative for the company in the eastern seaboard states.

Mohawk Rubber Promotes True

Election of Harold J. True as assistant treasurer of the Mohawk Rubber Co. was recently announced by the company's board of directors. A native of Akron, Ohio, Mr. True joined Mohawk Rubber in 1943 after serving in the U. S. Army Air Corps. Starting in the Sales Department, he was named service manager in 1948 and assistant credit manager two years later.

N. J. Zinc Shifts Sales Personnel

New Jersey Zinc Sales Co. has announced that R. W. Munson, formerly associated with the San Francisco, Calif., office of the company, has been transferred to the New York office. He has been succeeded at San Francisco by C. E. Mayerhauser. Mr. Mayerhauser has been associated with the company for many years and assisted Mr. Munson for quite some time. The company has also announced a new address for its San Francisco office at 1495 Custer Avenue, San Francisco 24. The telephone number is Mission 8-1112.

Federal Latex Dewebbing Compound

Federal Latex Corp., Brooklyn, N. Y., has developed a new dewebbing compound for use with latex dipping compounds. The company's dewebbing compound is said to prevent the formation of "webs" of dipping compound between adjacent parts of the dipping mold. This product assures a more faithful reproduction of the mold thereby requiring less finishing and lessening the number of rejects, the company states.

575,000,000th Pneumatic Tire

Goodyear Tire & Rubber Co. recently announced completion of its 575,000,000th pneumatic tire for motor vehicles, a significant new milestone for the firm. The record breaking unit was the company's latest snow tire, the "Suburbanite." Produced at Goodyear's Plant II, the tire was presented to vice-president R. S. Wilson, the firm's sales chief, with Russell DeYoung, vice-president in charge of production, witnessing the ceremony. Mr. DeYoung observed that it had required almost 18 years for the firm to build its first 25,000,000 tires, while the most recent 25,000,000 were completed within a record period of some nine months.

National Mask Hit By Fire

The factory of the National Mask and Puppet Corp. at 592-4 Pacific Street in Brooklyn, N. Y., was severely damaged by a three-alarm fire on December 5. Before the fire was brought under control, smoke had spread over much of downtown Brooklyn. At this writing, the extent of the damage had not as yet been determined.

RMA LOOKS TO ALL-TIME NEW CONSUMPTION RECORD BY INDUSTRY IN 1953

At the end of each calendar year the Rubber Manufacturers Association, Inc., offers a recapitulation of activities in the rubber industry during that year and forecasts what may be expected in the coming year. The RMA's annual report for 1952, including its estimates for production and consumption in 1953, follows:

Winding up 1952 almost completely free of use controls, the rubber manufacturing industry in the United States will score its second largest rubber consumption record in history. Consumption was higher in only one other year—1950, when the Korean War hysteria touched off wave after wave of scare buying. The 1952 consumption is estimated at 1,250,000 long tons of new rubber, as compared with the 1950 peak of 1,258,557 long tons. The industry consumed 1,214,298 long tons in 1951.

Based on the accelerating tempo of rubber goods production in the last quarter, an all-time new consumption record is forecast for 1953 by the industry's research statisticians in predicting the use of 1,300,000 long tons of new rubber over the next 12 months. As compared with last year, rubber consumption by type was:

	1951	*1952*
Natural Rubber...	454,015	450,000
Synthetic Rubber..	760,283	800,000
Total New Rubber	1,214,298	1,250,000
Reclaimed Rubber.	346,121	280,000

From the standpoint of the rubber manufacturer, 1952 was "emancipation year." When in April the National Production Authority lifted all rubber consumption controls, except for a token restruction on the use of pale crepe rubber, the industry was free of government-imposed restrictions for the first time since June, 1941.

Relinquishes Buying Roll

Not only were use restrictions lifted, but at the end of June the General Services Administration relinquished the role of exclusive buyer of natural rubber which it had held since Dec. 29, 1950, and returned buying to private industry. The Emergency Procurement Service of GSA remains in the rubber picture only as the custodian of the stockpile and as purchaser of rotation rubber and small additional strategic stocks.

By the same token, 1953 looms as the "year of decision" with respect to the problem of getting the nation's vast, government-owned synthetic rubber industry into private hands. The roadblock to disposal has been up to this point the proper insistence by Congress that as a condition of sale the nation must first have an adequate security stockpile of natural rubber and a synthetic rubber industry capable of standing on its own feet in free competition with natural rubber.

Those conditions have now been satisfied. The industry, the Defense Department and the many other agencies of the government concerned with the problem are agreed on that. The government has accumulated a natural rubber stockpile sufficient to carry us through more than five years of all-out war without any imports during the war period. Moreover, there is in being a synthetic rubber industry capable of producing more than a million tons of high quality rubber per year.

Not only are these basic conditions satisfied, but in addition the rubber manufacturing industry has had more than 10 years of experience with upwards of 700 different types of synthetic rubber, many of them superior for certain uses to any rubber or rubber-like material heretofore known.

Under Congressional directive, the Reconstruction Finance Corporation is now preparing a preliminary report on a disposal program. The report must be submitted to Congress by March 1, 1953. Forty-five days later, on April 15, 1953, the new President is required to submit specific disposal legislation to Congress.

Since the Rubber Act of 1948 expires March 31, 1954, it is the confident hope and expectation of the rubber manufacturing industry that private ownership and operation of the synthetic rubber plants will be an accomplished fact. This confidence has been greatly strengthened by indications that the new administration will rely more on private enterprise and less upon the agencies of government to administer the affairs of the industrial community.

Only the fact that the synthetic plants were able to supply the industry's new rubber requirements enabled manufacturers to meet 1952's near record civilian and military demand for rubber products. Moreover, this industry with a gross product valued at more than $5 billion closed the year with its distribution pipelines filled to their normal levels.

Tires paced the heavy consumption that followed generally through other divisions of the rubber manufacturing industry. Passenger car tire production is estimated at 73 million units for 1952, as compared with 66 million in 1951. Output was divided: 47 million units for replacement, 24 million for original equipment, 2 million units for increase in inventory and export shipments. The industry expects both truck and passenger car tire production in 1953 to exceed the 1952 level. The industry's forecast is that mechanical rubber goods, including heavy industrial types of belting and hose, will share the high level of demand that is seen for tires in 1953.

Foam sponge rubber, one of the sensational developments in the rubber industry, scored new gains in 1952—with one of the significant factors being development of synthetic latices that captured 40 per cent of a growing market heretofore dominated by natural rubber latex. Excessively high prices for natural latex stimulated development of synthetic latices that were able to compete successfully with the older raw material. Fastest growing new markets proved to be for furniture upholstery in the home and automobile upholstery on the road.

Lighter mechanical rubber goods, such as molded and extruded products, showed production gains on growing demand from manufacturers of automobiles, trucks, refrigerators, washing machines, radio and television sets, vacuum cleaners and literally thousands of other items.

The rubber heel and sole industry saw its product capture more than one-half of the new shoe and slipper market in 1952, and hailed the introduction of a new item that enjoyed immediate consumer popularity—cellular crepe heels and soles. This material took the place of natural crepe rubber products, manufacture of which was prohibited by NPA control Order M-2 during most of 1952.

Sales of camelback for recapping continued at a high level in 1952 despite competition that came with the introduction last year of the second line tire. Recapping of farm tires and the "winterizing" and "snow-treading" of used tires continued to show substantial gains.

Introduction of new, high-style lines in the rubber footwear and rubber-soled canvas footwear enabled that segment of the industry to improve its sales. And with such other segments as the coated materials, drug sundries, flooring and stationers rubber goods manufacturers, the footwear industry expects improved volume in 1953.

1952 Factory Employment

Factory employment in the rubber manufacturing industry averaged 220,000 clockcard workers in 1952. For clockcard workers in the tire and tube industry average hourly earnings again rose, the latest available figures published by the Bureau of Labor Statistics showing average hourly earnings for factory employees in the tire and tube industry to be $2.11 per hour. However, most of the tire and tube manufacturers received approval from the Wage Stabilization Board to grant a general wage increase of 10c per hour in October, 1952, which will result in an even higher level of earnings for these employees by the end of 1952.

The inferior quality of a large proportion of natural rubber shipped into this country presented manufacturers with one of their most difficult problems in 1952. Under exclusive government purchase, it was possible for the first time to analyze all imports on a quality basis. Both the industry and the stockpiling agency were shocked to find that 41.6 per cent of all natural rubber imported into this country in 1951 was of quality below the grade contracted for.

In an effort to educate manufacturers on this point and to assist them in getting what they pay for when they buy natural rubber, the Rubber Manufacturers Association instituted a series of nationwide seminars devoted to an explanation of proper purchase and inspection methods. There are approximately 900 rubber manufacturers in the United States, and the reasons for demanding better natural rubber quality were carried to nearly 2,000 of their technical, purchasing and production representatives at meetings in Akron, Trenton, New York, Boston, Buffalo, Chicago, and Los Angeles.

PLASTICS FILM AND SHEETING CONFERENCE HELD IN NEW YORK

The Fourth Conference of the Plastics Film, Sheeting and Coated Fabrics Division of the Society of the Plastics Industry, Inc., was held at the Commodore Hotel in New York, N. Y., on December 4 and 5. The conference featured the presentation of a number of interesting papers and a panel discussion on "Who Can Contribute the Most to the Future Sales Expansion of Vinyl Products—the Manufacturer or the Retailer?" Here, various points of view were presented from the standpoint of the chain store operator, department store operator, the mail order house, the resin producer, the film processor and the film fabricator.

Among the papers presented at the conference was one by Joseph R. Darby of the Organic Chemical Division, Monsanto Chemical Co. Mr. Darby spoke on "Flammability Studies with the SPI Tester." The speaker stated that the SPI tester provides an unexcelled method for determining flammability. Heretofore unsuspected factors can be measured through its use. The development of this instrument, he said, will undoubtedly prove valuable to the vinyl industry.

Mr. Darby reported on the results obtained on polyvinyl chloride film and sheeting when using an early model of the SPI tester. He discussed the preparation of test samples and the effect of plasticizers on flammability. He also discussed the effect of film thickness, fillers, and antimony oxide on the general problem of flammability. Mr. Darby concluded his talk by outlining the future of the SPI tester as he sees it.

Trends in Vinyl Finishing

Another paper at the conference, "New Trends in the Finishing of Vinyl Film and Sheeting," was presented by Dale G. Higgins of the Engineer Plastics Division of the John Waldron Co. For purposes of his discussion, the author considered the following classifications: (1) Decorative variations; (2) Construction variations; (3) Conversion effect on quality; and (4) Indicated trends in the decoration of plastic film and sheeting.

In this last classification, Mr. Higgins sees an increase in the popularity of the ink embossing technique. He also predicted a substantial increase in the volume of products manufactured by the embossing-lamination technique. This increase, Mr. Higgins declared, will include vinyl web to vinyl web as well as vinyl webs to nonwoven webs.

H. M. Quackenbos, Jr. of the Chemical Department of the Bakelite Co., also spoke at the meeting. Mr. Quackenbos delivered a paper on "The Practical Value of Test Methods in Vinyl Film and Sheeting." The author confined his remarks to mechanical properties and methods and properties related to migration of the plasticizer.

Mr. Quackenbos outlined three steps to practical success in choosing plasticizers or deciding whether a vinyl will do the job. One, eliminate the properties that do not matter. Two, is to decide whether the connection between the field conditions and test conditions are close or remote. Three, he said, depends upon step two in deciding how wide test differences must be to be significant.

Other papers of interest which were presented at the conference included the following:

"Fashion and Design Aspects in the Vinyl Film and Sheeting Industry" by Edgar Kaufmann, director of the New York Museum of Modern Art.

"Progress Report on the Vinyl Film Standard" by William T. Cruse, executive vice-president of the Society of the Plastics Industry.

"The Future in the Vinyl Upholstery Field" by Nat Ancell, vice-president and treasurer of the Baumritter Co., Inc.

Dr. Roy K. Marshall, television commentator and scientist, delivered a talk at the meeting and gave a demonstration on quality and inferior vinyl products.

WALNUT SHELLS FINDING USE AS MOLD CLEANERS IN FIRESTONE PLANTS

Finely ground English walnut shells are finding use as an efficient cleaner of aluminum tire molds in plants of the Firestone Tire & Rubber Co. Firestone buys 125,000 pounds of ground shells a year for this purpose. In use, the walnut shells are blown onto the mold in a blasting action which serves to clean the unit. The ground shells replace sand or other materials which are likely to pit the aluminum. In the photograph above, a company employee shows how the ground walnut shells look as they are used in the company's Akron plant.

Heads B. & S. International

Edwin B. Brooks, formerly vice-president of the Binney & Smith Company International, has been elected president. Charles A. Polachi has been elected vice-president of the firm, succeeding Mr. Brooks. Mr. Polachi has also been elected a director of the concern. Mr. Brooks joined the parent organization, Binney & Smith Co., in 1936, and has piloted the export activities of its international subsidiary since it was started in 1949. Mr. Polachi joined the technical sales staff of the international subsidiary in 1949. He holds a master's degree in chemistry from Holy Cross University.

A.M.A. to Sponsor Seminars

More than 1,500 executives from all sections of the country will pool business and industrial experience this spring in workshop seminars to be sponsored by the American Management Association. Between February and June the A.M.A. will conduct 102 seminars, intensive small-group discussions of specific management problems. Thirty of the groups will meet at the Palmer House, Chicago, and the remainder at the A.M.A. Management Center in the association's offices, 330 West 42nd Street, New York City. Each seminar is a discussion group of not more than fifteen executives under the guidance of one or more discussion leaders, meeting for three full days to explore a single area of management thought and practice. Twenty-five seminars on manufacturing problems are scheduled. Ten will meet May 11-13 at the Palmer House, Chicago. The others will be held at the A.M.A. Management Center, New York City, in groups of five each on February 4-6, March 11-13, and April 15-17. Among the topics to be discussed will be use of automatic equipment; production, forecasting, planning, and control; organization of the functions of engineering, quality control, maintenance, materials handling, and traffic management; purchasing for single-plant and for multiple-plant operations; organization of the manufacturing executive's job; factory budget and cost control; development of foremen and supervisors; and incentives for indirect workers. Producion planning and control will be discussed from the special viewpoints of processing and of fabricating industries.

Heads Agriculture Rubber Studies

Dr. Marion W. Parker

Dr. Marion W. Parker, associated with the Bureau of Plant Industry, Soils, and Agricultural Engineering of the Department of Agriculture since 1936, has been named head of the department's Division of Rubber Plant Investigations, Plant Industry Station, Beltsville, Md., succeeding Dr. Robert D. Rands, who recently retired after 32 years of research work in the Bureau. Dr. Parker holds a B. S. degree from Hampden-Sydney College and an M. S. and Ph. D. from the University of Maryland. For the past eight months he directed the physiological and biochemical studies on *hevea* under Dr. Rands. Most of his work in the department has been given to fundamental studies of the mechanism of light period effects on plant growth, flowering and fruiting. He is author or co-author of nearly 50 articles in this field.

Dr. Rands received his B. S. degree at the University of Nebraska and his M. S. and Ph. D. at the University of Wisconsin. During his career, Dr. Rands spent three and one-half years in Java as consultant on rubber problems for the Netherlands East Indies government. Returning to the department, he made a rubber tree disease survey in Panama and northern South America. With the approaching rubber crisis in 1940, Dr. Rands took charge of the Latin American cooperative rubber program. Dr. Rands will continue as a collaborator with the department.

Davis Leaves Ansbacher-Siegle

Peter E. Davis, well-known technical sales specialist in color pigments, has resigned as vice-president and general manager of the Ansbacher-Siegle Corp. He joined the company in 1936, served with the armed forces during World War II, then rejoined the company. In 1947, Mr. Davis was promoted to vice-president and continued in this capacity until his recent resignation, which was coincidental with the taking over of the company by new interests. Mr. Davis has not yet made any final decision regarding his future plans. After a brief vacation he will either affiliate with another color manufacturer or set up his own organization to distribute color pigments and related chemical products, equipment and machinery.

Leguillon Retires From Goodrich

Charles W. Leguillon, superintendent of the Machine and Process Development Department of the B. F. Goodrich Co., has retired from the company after 35 years. For 27 years Mr. Leguillon headed the department that was charged with developing, designing, and building machines, devices and tools to improve the manufacturing facilities and methods in Goodrich plants. Mr. Leguillon can point to some 100 patents, many of them basic, issued in his name during his career. He entered the rubber industry in 1917 when he joined the Experiment Department of the Goodrich company. His first assignment was on the rubber gas mask on which he collaborated with Dr. William C. Geer, then director of Goodrich research, and Dr. Roy G. Pearce, Akron physician. Mr. Leguillon was 38 years old when he was placed in charge of machine development, succeeding John Gammeter. During the next few years, he directed the development of the airplane de-icer and endless rubber tracks for tanks. Work on this latter development started in 1931 and the achievements of Mr. Leguillon and his staff won Goodrich international recognition. Mr. Leguillon moved from one project to another and in the mid-1930's, he worked with the late Wiley Post in developing the first practical stratosphere suit. At other times, he worked on machines covering various phases of tire building. A few of these accomplishments included the continuous tire building machine, roller die, automatic heel molding machine and electronic continuous curing of extruded rubber. While he has retired from the company, Mr. Leguillon will continue many of his activities.

Form Bacon Industries, Inc.

In order to serve clients and customers in a more efficient manner, Frederick S. Bacon and Philip D. Wilkinson, partners in the Frederick S. Bacon Laboratories, have announced the organization of Bacon Industries, Inc., Watertown, Mass., for the production of O-rings, gaskets and similar specialty products formerly manufactured by Frederick S. Bacon Laboratories. The direction and management of Bacon Industries will remain under the parent organization, with continued emphasis upon special molding materials and techniques required in instrumentation. In addition to manufacturing silicone rubber O-rings and gaskets, Bacon Industries will serve all needs in the specialty molding field from parts and mold design to material modification to suit special specifications.

Offers Fatty Acid Guide

The Wilson-Martin Division of Wilson & Co., Snyder Avenue and Swanson Street, Philadelphia 48, Penna., is offering a unique and time saving device for users of fatty acids. Called "A Guide to Better Fatty Acids", it is a simple, yet complete catalog on fatty acids in a circular slide rule form which instantly gives chemical specifications and approximate composition of the various types of fatty acids. Copies are available on request to the company.

Firestone Promotes Wiedenmann

Herbert H. Wiedenmann

Herbert H. Wiedenmann, formerly factory manager of the Los Angeles, Calif., plant of the Firestone Tire & Rubber Co., has been named factory manager of Plants 1 and 2 in Akron. A native of Minnesota, and a graduate of the University of Minnesota, Mr. Wiedenmann has lived in California for the past 24 years. He joined Firestone in 1928, splicing breakers in the Stock Preparation Department. While working on the third shift, he undertook graduate work at the University of Southern California. From 1929 to 1934 he worked in the Development Department; in 1934 he became geenral foreman of the Stock Preparation Department, and in 1935 was named general foreman of the Materials Preparation Department. In 1936, Mr. Wiedenmann became manager of the Tire Building and Curing Departments. In 1941 he was appointed production manager of the tire plant. When the Fuel Cell Division was started in 1942, Mr. Wiedenmann was transferred to it as division manager, a post he held until the end of the war when he was named assistant factory manager. In 1950 he was promoted to factory manager of the Los Angeles plant, a position he held until his most recent appointment as manager of the Akron tire factories.

ASA Rubber Glove Specifications

New specifications for rubber insulating gloves (J6.6-1952) were recently approved as an American standard by the American Standards Association, New York, N. Y., as a revision of ASA No. C59.12-1942. The new standard recognizes that rubber gloves are being used on higher line voltages and provides for three classes of gloves differentiated by ranges of minimum wall thicknesses from about 35 to 60 mils, and by proof test voltages of 10,000 volts, 15,000 volts and 20,000 volts, respectively. Tensile strength required of the rubber in the new gloves has been raised from 1800 psi to 2500 psi with no relaxation in the requirements for elasticity. The new thickness limits require greater uniformity than formerly. Joint sponsors of the ASA project on Rubber Protective Equipment for Electrical Workers are the American Society for Testing Materials and the Edison Electric Institute.

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Goebel Resigns as RMA Secretary

Richard H. Goebel, secretary of the Rubber Manufacturers Association and manager of its Traffic Department for 33 years, retired on December 31, 1952. Mr. Goebel will be succeeded as manager of the Traffic Department by George E. Gwinup, who joined RMA in October, 1952. Mr. Goebel has been known as one of the rubber manufacturing industry's top traffic experts for many years. Before joining RMA in 1919, he served with the Traffic, District and General Freight Departments of the Pennsylvania Railroad Co. He was subsequently head of the Freight Traffic Department of the Trunk Line Association made up of eastern railroads.

He held the post of secretary of RMA since 1932, and has served the industry as secretary or chairman of several of its product divisions and committees, the most extensive of these particular assignments being with the Crude Rubber Committee. During World War II, Mr. Goebel was chairman of the two traffic committees of the Rubber Reserve Co. He is a member of the National Industrial Traffic League; is a member and served as secretary-treasurer of the Shippers Conference of Greater New York from 1935 through 1950, and is a member and former officer of the Traffic Club of New York, Inc.

Mr. Gwinup came to RMA from the Celanese Corp. He had worked previously for the Missouri Pacific Railroad Co., his posts including that of chief clerk of the Pittsburgh office and freight traffic representative of the line's New York City office. He serves on the faculty of the Academy of Advance Traffic of New York and is a graduate of the St. Louis Traffic School.

Utility Color & Chemical Formed

The organization of Utility Color & Chemical Co., Inc. of 377 Frelinghuysen Avenue, Newark, New Jersey, has been announced by Dr. J. B. Shohan, president. The newly formed company, which recently purchased the assets of Utility Color Co., Inc., will manufacture a quality line of inorganic colors with particular attention to shade, texture and general working properties. According to Dr. Shohan, present owner of Valley Color & Chemical Co., Inc., V. Sanford Oliver will be technical director in charge of production, research and development. Mr. Oliver has been associated with the pigment industry since 1936. John N. Gulick, formerly sales manager of Redmond Distributors, has been named vice-president and general manager of the new firm.

Celanese Promotes Goodwine

The Chemical Division of the Celanese Corporation of America has named W. C. Goodwine as product manager of plasticizers and related chemicals. For the past five years, Mr. Goodwine has been in charge of organic phosphate sales for the company.

Need another copy of RUBBER AGE? Use the coupon on page 549.

News in Brief

Tubular sanding pads, used to support the sandpaper or finishing paper on Sundstrand Air Sanders are now being made from Hycar rubber.

"Please Pass the Condensate" is the title of a new 20-minute color and sound motion picture prepared by the Yarnall-Waring Co., Philadelphia, Penna., on the subject of up-to-date steam trapping for more production.

Columbia-Southern Chemical Corp. has issued a new technical bulletin describing "Hi-Sil C," its new companion product to the regular grade of Hi-Sil. Ask for Pigment Data Bulletin No. 52-7.

Use of Pliolite S-5 in stucco paints is described comprehensively in a new manual published by the Chemical Division of Goodyear. The manual is entitled "Stucco Finishes Made with Pliolite S-5."

Technical Data Sheet No. 14 issued by the Commercial Solvents Corp., New York, N. Y., gives the chemical and physical properties of dibutyl phthalate as produced by the company.

Revised technical information on "Lustrex X-820," a carboxyl-containing polyelectrolyte resin, is being offered by the Product Development Department of the Plastics Division, Monsanto Chemical Co., Springfield, Mass.

American Polymer Corp., Peabody, Mass., has announced the appointment of Cole & DeGraf of San Francisco, Calif., as sales representatives.

Complete information on proper procedures for preparing and painting concrete floors with paints containing Pliolite S-5 has been assembled in an illustrated folder by the Chemical Division of the Goodyear Tire & Rubber Co. The folder is entitled "This is the Way to Paint Your Concrete Floors."

Binney & Smith Co. has released a technical data brochure describing its products for the rubber industry.

Goodrich Presents "Belt" Bid

B. F. Goodrich Co. has placed before a group of Cleveland, Ohio, steel mills a "sales presentation" for a conveyor belt running along the Cuyahoga River from the Cleveland harbor to as far south as necessary to serve the steel industry. Meanwhile, Riverlake Belt Conveyor Lines, Inc., backed by the A.C. & Y. Railroad and the Goodyear Tire & Rubber Co., has announced Cleveland as "the logical site" of its lake terminal for the proposed 100-mile belt conveyor between Lake Erie and the Ohio River. In all earlier plans of Riverlake, the lake terminal has been Lorain, Ohio. The two proposals are similar in that both would carry iron ore direct from lake ore carriers in Cleveland harbor and thus eliminate costly pushing of big lake freighters up the Cuyahoga River by tugs. Both the Goodrich and the Riverlake plans have one big hurdle—designation of conveyor belts as common carriers with the right to obtain right-of-way through condemnation as railroads do now. Riverlake has twice sought this common carrier designation in the Ohio Legislature without success and is planning on making a third bid in the coming session. Cleveland city officials said they estimated the Goodrich conveyor would cost $10,000,000, but company officials believe that the belt can be built and installed for less than that figure. The Riverlake conveyor would cost more than $200,000,000 and officials estimate it would carry 20,000,000 tons of ore south from Lake Erie and the same tonnage of coal north from the Ohio River.

Government Amends DuPont Suit

The Justice Department has moved to reduce the scope of its anti-trust suit against the du Pont family by striking several score defendants from the case. The government was to have asked the Federal District Court in Chicago, Ill., on January 5, 1953, for permission to amend the suit so as to bring the 118 individual defendants down to 35. The objective, it was said, is to streamline the case and make it less unwieldy for trial. The anti-trust action was brought in 1949 against Pierre, Lammot and Irenee du Pont and included all members of the family related to them by blood or marriage, as well as a long list of companies allegedly controlled by them, including General Motors Corp. and the U. S. Rubber Co. The suit alleged that this control had resulted in trade restricting practices, and ask court orders for wholesale divestments by the du Ponts in many of these corporations.

Establishes Research Division

Technical Tape Corp. has established a Research Division in a newly leased building in the Bronx, New York City, adjacent to the company's principal plant. Activities of the new division will be concentrated on the development of new products utilizing the basic ingredients used in the company's operations and those of its associated companies, principally W. Ralston & Co., Old Bridge, N. J.

GIDLEY RESEARCH INSTITUTE ANNOUNCES NEW PRIZE CONTEST

The Gidley Research Institute, Fairhaven, Mass., has announced plans for a rubber technical prize contest which will be held from January 15 to June 15, 1953. According to Philip T. Gidley, president of the Institute, there is in every rubber factory a group of hereto largely inarticulate technicians and chemists who should be heard and who have a message of real practical value to the industry. Each of them has solved some problem which merits expression and which would contribute to the general fund of knowledge of the industry.

Therefore, the contest rules state that any subject in the field of industrial rubber manufacturing technology may be covered. The subject of the article or report, however, and the content of the article must be practical and technical rather than theoretical only. Typically acceptable subjects would be: "Causes and Elimination of Porosity in 3-Roll Calendering," "Practical Considerations in Mold Design," "A Factory Scheduling System for the Press Room," "A Study of the Efficiency of Mold Lubricants for Vacuum Cups," and subjects of a similar nature.

Articles submitted must be not less than 500 words and not more than 5,000 words. Photographs, graphs and blueprints may be included but are not necessary. All articles should be addressed to: Rubber Technical Contest, Gidley Research Institute, Fairhaven, Mass.

The first prize will be $200 in cash, and the next nine prizes will consist of valuable merchandise. The most meritorious articles will be published in RUBBER AGE.

Air Reduction Expands Plant

Air Reduction Co. has announced that the capacity of its calcium carbide plant at Calvert City, Ky., is to be doubled. The additional capacity is expected to be ready in 1954. The original plant, which is nearing completion, has a rated capacity of 142,500 tons of calcium carbide a year. Company officials explained that the capacity of the plant is being expanded to meet the increasing needs of the chemical industry for acetylene generated from calcium carbide. Large quantities will be shipped from Calvert City to supply acetylene to the DuPont neoprene plant at Lexington, Ky. At Calvert City, Air Reduction assembled 1,500 acres of land in order to make plant sites available for chemical manufacturers who wish to receive acetylene via pipeline. The B. F. Goodrich Chemical Co. has located a plant on the site for the purpose of making vinyl chloride monomer. Negotiations with other prospective customers are being carried on.

Witco Moves New York Office

Witco Chemical Co. has announced the removal of its home offices from 295 Madison Avenue in New York City to 260 Madison Avenue, New York 16. The new offices, located in a new building, provide more space and take advantage of the latest developments in office building design.

Coming Events

Jan. 21. Washington Rubber Group, PEPCO Building, Washington, D. C.

Jan. 23. Philadelphia Rubber Group, Poor Richard Club, Philadelphia, Penna.

Jan. 30. Akron Rubber Group, Mayflower Hotel, Akron, Ohio.

Feb. 13. Detroit Rubber and Plastics Group, Detroit-Leland Hotel, Detroit, Mich.

Feb. 23. Quebec Rubber and Plastics Group, Victoria Hall, Westmount, Que., Canada.

Mar. 18-20. Rubber Division, A.C.S., Hotel Statler, Los Angeles, Calif. (In conjunction with 122nd meeting of A.C.S.).

Mar. 19. Quebec Rubber and Plastics Group, Queen's Hotel, Montreal, Que., Canada.

Mar. 20. Boston Rubber Group, Spring Meeting, Hotel Somerset, Boston, Mass.

Apr. 16. Quebec Rubber and Plastics Group in Joint Meeting with S.P.E. and S.P.I., Queen's Hotel, Montreal, Que., Canada.

May 27-29. Rubber Division, A.C.S., Spring Meeting, Hotel Statler, Boston, Mass.

June 19. Boston Rubber Group, Summer Outing.

Sept. 9-11. Rubber Division, A.C.S., Fall Meeting, Hotel Sherman, Chicago, Ill.

Oct. 16. Boston Rubber Group, Fall Meeting, Hotel Somerset, Boston, Mass.

Dec. 11. Boston Rubber Group, Xmas Party, Hotel Somerset, Boston, Mass.

Apr. 14-16, 1954. Rubber Division, A.C.S., Spring Meeting, Hotel Brown, Louisville, Ky.

Sept. 15-17, 1954. Rubber Division, A.C.S., Fall Meeting, Hotel Commodore, New York, N. Y.

ODM Pamphlets of Interest

The Office of Defense Mobilization, Washington, D. C., has issued a set of pamphlets particularly useful to the employer because they deal with two major problems that confront him. One of these is how to keep workers healthy and on the job. This is explained in "The Worker and His Health." The employer is also faced with the problem of reducing his labor turnover, and the manner in which he can best utilize the aged, the handicapped and women. The tangible contributions of these workers are documented in the pamphlets "The Disabled Can Work," "Production at Any Age," and "A Job for Women." Copies of these interesting publications are available from ODM.

FORT WAYNE GROUP MEETING FEATURES TALK ON PATENTS

The Fort Wayne Rubber and Plastics Group held its second meeting of the 1952-53 season on December 4 at the Van Orman Hotel in Fort Wayne, Ind. The meeting featured a talk on "The Use of Patents in Research and Development" by T. A. TeGrotenhuis of the law firm of Evans & McCoy, Cleveland, Ohio. A film entitled "Stretching Highway Dollars with Rubber Roads" was also shown through the courtesy of the Natural Rubber Bureau, Washington, D. C.

In his talk, Mr. TeGrotenhuis explained that patents are a contract between the public and the inventor. The history of monopoly, he said, extends back to Crown grants in England in 1327. Abuse of monopolies led to the Monopoly Act of 1623 which abolished all monopolies but excluded patents. It was noted that the Constitution of the United States permits Congress to pass patent legislation.

The use of patents in the promotion of ideas and to provide risk capital for the stimulation of new industry was discussed. The requirements for invention were pointed out as well as means of protecting inventions. Recent changes in the Patent Laws, effective January 1, 1953, were explained along with examples of their effects. In closing, the speaker stated that all countries which are considered progressive have patent systems which reward the inventor in some manner.

"Burco-RA" Reclaiming Agent

Burgess Pigment Co., Paterson, N. J., has introduced "Burco-RA", described as a complete reclaiming agent for general purpose rubber reclaiming. In appearance, the product is a brown mobile liquid at room temperatures. It has a specific gravity of 0.987 to 1.0 at 60/60° F. With a moisture content of 1.0% maximum, Burco-RA has good storage stability for an indefinite period of time. Its ash content is 0.04 to 0.08% and its acid number is approximately 65. The product is effective as a reclaiming agent with natural rubber, synthetic rubber, or with combinations of natural and GR-S rubbers. It is also effective with neoprene and the acrylonitrile rubbers. Because of its relatively high distillation range, Burco-RA is said to produce a minimum of objectionable smoking in the reclaiming process. It is non-toxic and is available in 55-gallon drums, tank trucks and tank cars.

Celebrates Silver Anniversary

A silver anniversary celebration by the Goodyear Tire & Rubber Co. of Great Britain, Ltd., combined with receipt of the National Safety Council's Award of Honor, given for an "outstanding demonstration that industrial operations can be performed safely," was held on December 15 at Wolverhampton, England. The English plant worked 5,077,838 man hours from February 15 to October 10, 1952, without a disabling injury. If another two months could have passed without an injury, a world's record in safety would have been established.

Thermoid Chemical Offers Fortex

Thermoid Chemical Co., Trenton, N. J., a subsidiary of the Thermoid Co., has introduced "Fortex," a new multi-purpose rubber fortifier and extender. Not only is the product useful as a processing aid, but it is said to impart valuable properties to the finished products. As a processing aid, Fortex is a plasticizer and an anti-crosslinking agent. Production experience has indicated that Fortex should be added directly to the rubber early in pre-breakdown or at the start of milling to gain full advantage of its properties. As a dispersing agent. Fortex is said to permit high loading with carbon black at lower temperatures. Pigments are more easily taken up and all colors, including white, can be obtained. Fortex can replace all or part of the stearic acid in a recipe, Thermoid Chemical states. The product reinforces by increasing tensile strength, moduli and hardness. It also improves tear resistance. resilience and age resistance, according to the company. Fortex is a brown liquid which pours easily when warmed. It can be used in processing natural and reclaimed rubber and all the synthetics except polysulfide rubber and Butyl. It is non-toxic and non-volatile. Herron Bros. & Meyer, Inc., are sales agents for Fortex.

Naugatuck Wins Safety Award

The Naugatuck, Conn., plant of the Naugatuck Chemical Division, U. S. Rubber Co., has been awarded the National Safety Council's Award of Honor for three million man-hours without a disabling injury. The award, the highest honor of the safety council, was presented to the plant's 1500 employees by Ned H. Dearborn, president of the National Safety Council at ceremonies held in the plant. Philip E. Rice, factory manager, was presented with a Certificate of Appreciation by H. E. Humphreys, Jr., president and chairman of U. S. Rubber in recognition of his services in accident prevention. The Naugatuck plant began its record performance on October 12, 1951. It is still continuing the record, and at the present time, has over three and a half million man-hours without a disabling injury. The chemical plant is the second of the 40 plants in the company to be presented with the Award of Honor. Earlier this year, the award was made to the Scottsville, Va., plant of the company's Textile Division. Scottsville, a much smaller plant, began its award performance in 1946.

Bakelite Plant Hit by Fire

Production and shipments of all vinyl, polystyrene and polyethylene compounding materials remained normal after a blast and fire hit one of the buildings at the Bound Brook, N. J., plant of the Bakelite Co. One employee was killed and twenty-six others injured in the blast and in the flames which raged for more than an hour. The blast and fire were attributed to a dust explosion and damages were estimated at less than $500,000. Only shipments of standard phenolic molding materials were affected, and it was expected that production and shipments will be resumed within a few weeks.

FISHER ACCEPTS PROFESSORSHIP AT UNIVERSITY OF SOUTHERN CALIFORNIA

Dr. Harry L. Fisher, whose election as president of the American Chemical Society for 1954 was announced last month, has accepted appointment as the first director of education and research for the $100,000 Rubber Technology Foundation of the Los Angeles Rubber Group at the University of Southern California. The appointment was announced by Fred D. Fagg, Jr., president of the university.

Dr. Fisher, formerly director of organic research of U. S. Industrial Chemicals, Inc., and currently special assistant to the director of the Office of Synthetic Rubber of the Reconstruction Finance Corporation, will leave for California in mid-January and will take over his new duties at U.S.C. on February 1. He will be Professor of Rubber Technology in the School of Engineering and will teach a course in "New Developments in Rubber Chemistry and Technology" for engineering students, as well as directing laboratory work the results of which will be made available to the rubber industry. Dr. Robert E. Vivian is dean of the school.

The Rubber Technology Program in the U.S.C. School of Engineering was set up last year by the Los Angeles Rubber Group and was supported financially by rubber manufacturing companies and suppliers throughout the country. The initial goal of $100,000 was reached some time ago, and the sponsors of the program believe that additional sums will swell the total, assuring long continued operation at the university.

Dr. Fisher was elected ACS head for 1954 in a national ballot of the society's 67,000 chemists and chemical engineers, in which Professor Raymond E. Kirk, head of the Department of Chemistry and dean of the graduate school in the Polytechnic Institute of Brooklyn, and Dr. Ernest Volwiler, president of Abbott Laboratories, North Chicago, Ill., were named to the society's board of directors. They will serve three-year terms.

Born in Kingston, N. Y., on January 10, 1885, Dr. Fisher received his A. B. degree from Williams College in 1909 and his A. M. from Columbia University in 1910. After obtaining his doctorate in organic chemistry in 1912, he remained at Columbia until 1919 as an instructor. For the next seven years, he was a research chemist with the B. F. Goodrich Co. in Akron, and from 1926 to 1936 he was in the Development Department of the U. S. Rubber Co. During this period, he conducted intensive research on rubber and rubber derivatives, with special emphasis on methods of vulcanizing rubber without the use of sulfur. He joined U. S. Industrial Chemicals, Inc., in 1936, and retired from that firm in 1950.

Dr. Harry L. Fisher

Following his retirement from U. S. Industrial Chemicals, Dr. Fisher served as administrative assistant in the Division of Chemistry and Chemical Technology of the National Research Council. Here, he was in charge of arrangements for the Twelfth International Congress of Pure and Applied Chemistry, held as part of the World Chemical Conclave in New York in September, 1951. He also supervised arrangements for the Sixteenth Conference of the International Union of Pure and Applied Chemistry, also a part of the Conclave, which was opened by the Diamond Jubilee Meeting of the American Chemical Society. After these assignments were concluded, Dr. Fisher joined the RFC Office of Synthetic Rubber, at Washington, D. C., as a special assistant to the director.

A member of the American Chemical Society for the past 42 years, Dr. Fisher has been honored with many elective offices, including the chairmanship of the Division of Rubber Chemistry and that of the Akron and Western Connecticut Sections. He also has been secretary of the Division of Organic Chemistry and a councilor-at-large of the national society.

In 1949 the Division of Rubber Chemistry awarded Dr. Fisher its Charles Goodyear Medal for outstanding achievement in the chemistry of rubber. He has received other honors, including the Modern Pioneer Award of the National Association of Manufacturers in 1940, while in 1941 he was the Edgar Marburg lecturer for the American Society for Testing Materials.

Dr. Fisher is a member of Phi Beta Kappa, Sigma Xi and Phi Lambda Upsilon. He is married and has two children, a son and a daughter.

IRRI ISSUES SPECIAL REPORT ON DIRT CONTENT OF NATURAL RUBBER

The possibilities of reducing the dirt content of natural rubber have been under investigation for some time by the Indonesian Rubber Research Institute (IRRI). In this connection questionnaires were recently sent to rubber consumers in various countries in an effort to determine the effect of dirt in rubber. These questionnaires were distributed by several technical rubber organizations which arranged the replies in such fashion as to represent opinions by manufacturers in specific countries. For example, the Rubber Manufacturers Association submitted a summary compiled from questionnaires received from 10 American rubber manufacturers.

Based on the replies received to date, Dr. K. F. Heinisch, of the IRRI staff, has compiled a special report under the title of "A Survey on Dirt Content of Natural Rubber," copies of which have been issued by the Institute. In his report, Dr. Heinisch stated that many of the answers received differed greatly and were sometimes in contradiction with one another. It may prove, he states, that the industry itself may not as yet hold a definite opinion on various points. The cause for this is partly because the applications of rubber are so numerous. Requirements with regard to cleanliness vary according to the final application and the manufacturing process involved.

Difficult to Define Dirt

Dr. Heinisch points out that an accurate definition of harmful dirt according to quantity, particle size, or nature of the dirt, is difficult to give, as there is no agreement on the harmfulness. In most cases it is recommended that a standard of harmful dirt be taken as the residue that is retained on a 325 mesh or 200 mesh (U. S. Standards) screen on sieving a rubber solution. The French have offered another definition, by which not only all the dirt that is left on a 200 mesh screen, but also the dirt which passes through this screen, if it amounts to more than 0.5%, would be considered as harmful dirt. This latter definition gives rise to the importance of introducing, in addition to "harmful dirt," the "total dirt content" as a suggested basis in some cases.

In cases where no distinction was made between harmful and harmless dirt, the amount and particle size of the dirt were considered as the determining factors as to whether or not a rubber might be considered suitable for a specific product. It has been pointed out in this connection that a large amount of small particles may cause more harm than a small amount of large particles, although the harmfulness of dirt is assessed by particle size and quantity. The setting up of maximum limits to allowable dirt and ash content for each RMA-type of natural rubber would, therefore, seem highly desirable.

In order to determine the dirt content, numerous methods have been adopted. Some manufacturers evaluate their rubber according to outward appearances only, while others apply a quantitative method of determination. It is apparent that preference is shown to quick, optical methods, whereby the number of dirt particles counted in a certain area of a plasticized sample, or in a sample of a certain weight, is taken as determining the degree of contamination.

The difficulty encountered in all cases, with the exception of the method whereby the entire lot is strained through a screen, is the taking of a representative sample as a result of the non-homogeneous distribution of the dirt. A statistical analysis of the distribution of dirt in samples may prove of great help, Dr. Heinisch states.

Dirt, says the author, is generally defined as particles of foreign matter other than rubber hydrocarbon and the natural serum substances which can be separated from the rubber by physical methods. Most common contaminations found in rubber are sand, bark, wood splinters, fibers, gravel, plant fragments, as well as impurities picked up by the bales during transportation. Very often mould is encountered on bales, mainly on sheets, which is generally considered to be more or less harmful. In general, both the inorganic and organic type of dirt is considered equally harmful. Either will be detrimental to the quality, if it is hard enough to resist breaking up during milling to a particle size that is considered harmless.

Another important matter with regard to processing is the behavior of the dirt during plasticizing and compounding. According to its nature and hardness it is possible to crush dirt to a certain extent, but impurities are not likely to be crushed to a harmless particle size. Opinions were divided as to the effectiveness of breaking up in the Banbury or in the mill, whereas there was a marked preference for a cold mill which is more effective for this operation.

Harmful effects of the dirt will show up both during processing of the uncured rubber and in the performance of the vulcanizate. The most common difficulties encountered in the processing of natural rubber occur during extruding, calendering, processing of thin-walled articles, mixing, dipping and spreading. Seventeen kinds of articles were specified as being particularly susceptible to dirt, among these being thin-walled articles, rubberized goods, inner tubes, pneumatic articles, insulated goods, surgical goods, tires, shoes, etc.

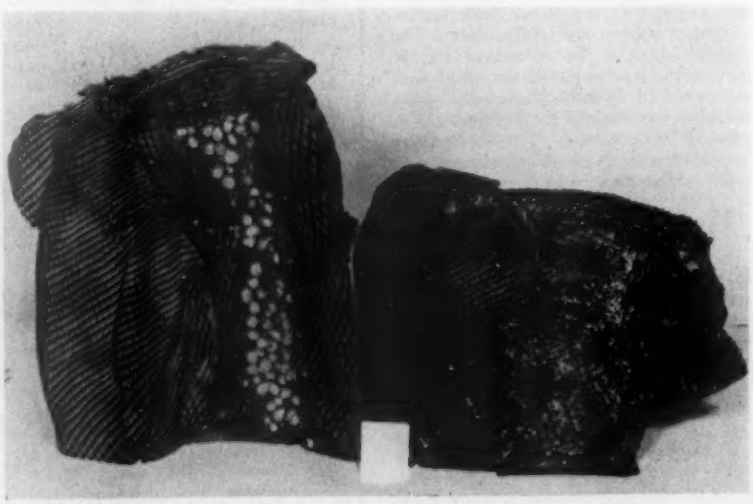
The physical and mechanical properties of the finished products which are said to be adversely affected by dirt are permeability, electrical properties, tensile strength, fatigue resistance, tear and abrasion resistance, water absorption, elongation, and flex life. Further, the homogeneity of the compound and the appearance of the finished product, such as smoothness and color, are impaired. Dirt acts as a center of localized destruction, causes leaks in gas and water containers, causes cracks to form, and sometimes even affects the smell of the product.

Shipping and Transportation

With regard to shipping and transportation, it has been observed that all types of rubber have a tendency to pick up dirt. Removing such external dirt, however, is not so much a matter of difficulty as of expense. It is the general opinion that the problem of contamination of bales with dirt is partly solved by the application of a coating. This coating must be perfectly dispersible, however. It is generally recognized that fibers are particularly difficult to remove, and it is therefore recommended that packing in fabrics or jute be rejected.

Many rubber manufacturers emphasize the fact that quite often in rubber bales, even those of higher grades, objects have been found which can hardly be classified as dirt and must have gained entrance as a result of carelessness and insufficient control. Scissors, knives, money, stones, bullets, etc., have been found in bales and these objects may cause damage to mills and mixers more serious than the effects of dirt.

Several recommendations have been made for greater care and better control



The photograph above shows impurities picked up during transportation by poorly coated rubber bales. The bale at the left shows grains of maize adhering to the rubber, while the bale to the right has picked up some rice grains in transit.

during all stages of preparation, packing and handling of natural rubber. Also noted was the desirability of an improved method of packing in order to better comply with the requirements than the present bare-back packing, e.g., packing in impregnated fabrics, sheets of artificial materials, vulcanized rubber sheets, etc.

Another point which deserves special attention, says the author, is the coating of bales with an unsuitable mixture. This results in unsatisfactory protection of the bale, or the formation of a hard layer on the bale which may not break up and disperse in milling. The practice of using excessive quantities of talcum between sheets in a bale—although talcum is not generally considered dirt—is objectionable as it causes further contamination.

Dr. Heinisch states that much work must still be done by producers. It was hoped that as a result of the answers received from the questionnaires, directives could be formulated. This was not possible, however, because the rubber consuming industry is not yet in a position to define clearly its requirements concerning dirt content.

Outlines Needed Directives

The directives which are needed, says Dr. Heinisch, are the following: (1) Definition of the limits of allowable dirt content, subdivided, if necessary, according to applications; (2) Method of sampling; (3) Method of testing consisting, if necessary, of one official standard test and several simple routine tests that can be compared with the standard test.

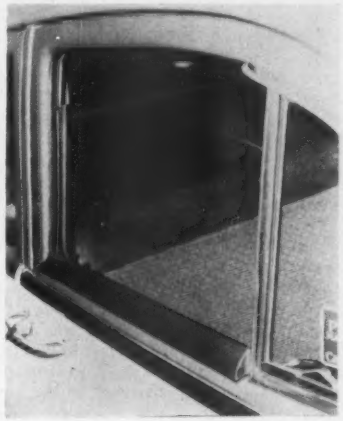
The task of indicating how the requirements of the rubber consuming industry can be met by the rubber producers has been undertaken by the Indonesian Rubber Research Institute. A memorandum has already been submitted to the various rubber research institutes cooperating under the aegis of the International Rubber Research Board in which a tentative proposal has been made for a suitable and operative "Dirt Content Classification." It is hoped that as a result of this effort a workable classification will be available in the not too distant future.

U. S. Duties on Powdered Rubber

According to trade reports the removal of U. S. duties on rubber powder is now being urged. U. S. Customs officials now classify the powder as a semi-manufactured item, thus taking it off the free list enjoyed by most rubber commodities. The powdered rubber duty was 20% until a Reciprocal Trade Agreement with Indonesia cut the tariff to 10% last winter. Spokesmen for the Natural Rubber Bureau say the powdered rubber is no more a manufactured item than is sheet rubber. They want U. S. Customs to reclassify the material, killing the present duty. Meanwhile, importers are seeking the same result in U. S. Customs Court in New York. The importers say the rubber powder is just another item in the picture of U. S. customs restrictions on trade. They relate it to the current slogan, "trade instead of aid" to bolster world economies and cut American foreign aid expenses.

"Windowmatic" Car Accessory

A new car window accessory named "Windowmatic" has been announced by the Braun Manufacturing Co., Chicago, Ill. The unit combines a neoprene rubber strip and a stainless steel spring hinge mounted on the outside top of the car door window sill. In operation, "Windowmatic" performs five important functions in that it waterproofs the inside of the car door; squeegees the outside of the car windows when they are raised or lowered; stops window rattle; seals against drafts blowing in through the window channel; and, in addition, may be used as a comfortable arm rest when the window is lowered. The unit is made in two adjustable sizes to custom-fit all cars and trucks. It is quickly and easily installed.



Building New Research Labs

Bauer and Black, a division of the Kendall Co., Chicago, Ill., has announced that construction is underway on new and larger laboratories to house its research and development activities. The new laboratories will be located at the company's Chicago plant. Company officials stated that the new laboratories have been necessitated by the rapidly expanding activities of the firm in the fields of surgical and consumer wound dressings, hospital and surgery supplies, medical products research, and various new industrial products including a variety of pressure-sensitive adhesive tapes useful to industry. The new facilities will provide laboratories for enlargement of activity in the biological sciences. In the field of physical chemistry, consideration has been given to the necessary instrumentation, present and future, for the study of the physical phenomena of adhesion forces and the macro and micro structure of the new plastic films and plastic adhesive tape products recently introduced.

New Huber Carbon Black Bag

A new valve-type bag that is said to give more stable, more compact unit load shipments of carbon black, with a substantial saving in space, has been announced by the J. M. Huber Corp., New York, N. Y. Carbon black unit loads made up with the new bags are not only more stable but also easier to handle than similar old-style loads. A 2500 pound unit load of fifty 50 pound valve-type bags is only 69 inches high in contrast to 84 inches for a unit load of conventional bags. Other load dimensions are approximately the same. Total volume of a new-style unit load is 95 cubic feet contrasted with 108 cubic feet. The new bags also stack better in conventional car loadings. There is an 18 percent saving in height with the new unit loads and over-all volume saving of 12 percent, the company states. Whether the black is received in unit or loose bag loads, these savings still accrue. This means significant space saving in the customer's plant where the bags are stored for future use. The new valve-type bags are currently available in carload and truckload shipments for all of Huber's channel blacks. Development work is in progress on a similar package for Huber furnace blacks.

"Flexiduct" Rubber Floor Duct

Winders & Geist, Lincoln, Nebr., has introduced a new rubber floor duct especially designed to dispose of over-the-floor wiring problems in office buildings, warehouses and similar places. Designed by the company, the product, called "Flexiduct," is produced by the Goodyear Tire & Rubber Co. at its extruded rubber goods plant at St. Mary's, Ohio. Providing complete protection for all types of inside wiring installations, this new floor duct is moisture proof and will wear almost indefinitely. It is made of rubber two and three-quarter inches wide at the base and rises from a feather edge to an apex of seven-sixteenths of an inch. Flexiduct is applied easily and quickly in any desired length with a special cement. Its flexibility allows it to adhere evenly and securely to all types of floor surfaces, yet it can be removed at will by simply prying one end loose and pulling it up. Riser fittings are available so that wires may be run directly under desks or other equipment.

Army Ordnance Rubber Items

The Ordnance Corps, Department of the Army, is preparing a list of rubber suppliers and their compounds which meet the requirements of the SB, SC, and RS grades of Specification MIL-R-3065 (similar to SAE-ASTM D735-51T). There is particular interest in grades of 500, 1000, 1500, and 2000 pounds per square inch tensile in the 40, 50, 60, and 70 durometer hardness range. Suffix combinations may include A, B, C, and FF. The FF test requirement is non-failure after 24 hours conditioning at —65° F., using the impact brittleness apparatus of ASTM D746. Interested suppliers of such rubber compositions are invited to submit their samples or address their inquiries to the attention of the Rubber Laboratory, Rock Island Arsenal, Rock Island, Ill.

RUBBER GROUPS ABOUT THE COUNTRY HOLD ANNUAL CHRISTMAS MEETINGS

The various rubber groups about the country brought 1952 to a close with the traditional Christmas meeting. Group members and their guests generally enjoyed a special dinner, programs of entertainment and, in some cases, elected officers for the new year. The following groups have reported on their activities during the holiday season:

BOSTON RUBBER GROUP

Approximately 580 members and guests of the Boston Rubber Group attended the Annual Winter Meeting and Christmas Party which was held on December 12 at the Hotel Somerset at Boston, Mass. The meeting featured an election of officers for the 1953 season. Alan W. Bryant (Binney & Smith) was named chairman, while W. Fraser Malcolm (Titanium Pigment) was elected vice-chairman. Edwin D. Covell (Stedfast Rubber) was elected secretary-treasurer. Arthur I. Ross (American Biltrite Rubber) was named to the Executive Committee. The retiring chairman, John Andrews (Godfrey L. Cabot), who is being transferred to England by his company, was able to be present as a special guest. A special program of entertainment was presented. Richard Patrick (Vulplex) acted as chairman of the Entertainment Committee.

BUFFALO RUBBER GROUP

The Buffalo Rubber Group held its Annual Christmas Party on December 17 at the Buffalo Athletic Club in Buffalo, N. Y., with approximately 140 members and guests in attendance. The celebration consisted of a cocktail hour, dinner, a program of entertainment and a drawing for door prizes. The results of the annual election were announced as follows. Russell Schutz (U. S. Rubber Reclaiming) was elected chairman for the 1953 season with Glenn Meyers (James Meyers) as vice-chairman. Gene Ciminelli (U. S. Rubber Reclaiming) was elected secretary-treasurer. Don Schuler (Dunlop Tire) and Frank Niemszyk (Buffalo Weaving & Belting) were elected to the Executive Committee for a three-year term. Neil Peffer (Buffalo Weaving and Belting) and Ed Martin (Hewitt-Robins) were elected to the committee for a two-year term. Elected to the Executive Committee for a one-year term were Jean Nesbit (U. S. Rubber Reclaiming) and Charles Johnson (Hewitt-Robins).

CHICAGO RUBBER GROUP

Some 900 members and guests of the Chicago Rubber Group attended the Annual Christmas Party held on December 19, 1952 at the Morrison Hotel in Chicago, Ill. The evening consisted of dinner, favors, entertainment and dancing. Howard Ling served as chairman for the party while Richard Blair acted as co-chairman in charge of entertainment. Ben Yunker was in charge of favors, and John Swart was in charge of solicitations. John O'Keefe was in charge of ticket sales and seating.

DETROIT RUBBER AND PLASTICS GROUP

Over 550 members and guests attended the Christmas Party held by the Detroit Rubber and Plastics Group at the Sheraton Cadillac Hotel in Detroit, Mich., on December 12. Dinner, prizes and a program of entertainment were provided. G. P. Hollingsworth (Minnesota Mining), the outgoing chairman, announced candidates for officers for the 1953 season as selected by the Nominating Committee. They were: *Chairman*, E. V. Hindle (U. S. Rubber); *Vice-Chairman*, W. J. Simpson (Chrysler); *Secretary*, W. F. Bauer (Brown Rubber); *Assistant Secretary*, E. W. Tillotson (Wayne University); *Treasurer* J. T. O'Reilly (Ford); *Assistant Treasurer*, H. W. Neale (Pioneer Latex). In addition, the following members were named as committee heads for the 1953 season: J. B. Ledden (DuPont) was named chairman of the Program Committee, while H. F. Jacober (Baldwin Rubber) was named assistant chairman of the same committee; J. B. Craft (General Tire) was named chairman of the Publicity Committee, with Don Koza (Automotive Rubber) as assistant chairman; R. C. Chilton (Permalastic Products) was named chairman of the Entertainment Committee, with H. Wiles (GMC) as assistant chairman; V. H. Vodra (Wyandotte Chemicals) was named chairman of the Educational Committee, with E. J. Kvet (Detroit Tank Arsenal) as vice-chairman; H. W. Hoerauf (U. S. Rubber) was named as chairman of the Membership Committee, while W. Wiard (Dow Corning) was named assistant chairman; T. W. Halloran (Chemical Products) was named historian; while G. T. Lindner (Minnesota Mining), Mr. Hollingsworth and G. M. Wolfe (Sharples Chemicals) were named as group counselors. At the meeting, members unanimously voted the slate recommended by the Nominating Committee.

LOS ANGELES RUBBER GROUP

Over 600 members and guests of the Los Angeles Rubber Group attended the Annual Christmas Party held on December 12 at the Hotel Statler in Los Angeles, Calif. This gala affair consisted of dinner, dancing, a program of entertainment and the distribution of door prizes. In addition, officers for the 1953 season were announced as follows. Deke Maddy (Harwick Standard), chairman; L. E. Budnick (Ohio Rubber), associate chairman; Cam Johnston (Caram Mfg.), vice-chairman; Roy Phelan (Atlas Sponge), treasurer; and Carl Hoaglund (R. D. Abbott), secretary. Al Federico (C. P. Hall), Tommy Thompson (Firestone) and Dickson Sheppard (Goodyear) were elected as directors of the group. The group voted three life memberships for outstanding past services to Curtis Wolter (California Rubber Products), Al Pickard (Braun) and Charles Roese. A special token of appreciation was presented to V. Hromatka, official group photographer.

NEW YORK RUBBER GROUP

Approximately 500 members and guests of the New York Rubber Group enjoyed the gala Annual Christmas Party held on December 12 at the Henry Hudson Hotel in New York City. The meeting began with a cocktail hour which was followed by the serving of an excellent dinner. A program of entertainment followed and then a drawing was held for a number of valuable door prizes. The group members offered a standing vote of thanks to the outgoing officers and directors while the new officers were introduced.

NORTHERN CALIFORNIA RUBBER GROUP

The Northern California Rubber Group held its Twelfth Annual Christmas Party on December 4th, 1952 at the Villa Lorenzo in San Lorenzo, Calif. The party was attended by some 140 members and their guests who enjoyed an evening of entertainment and dancing. At the meeting, new officers for the 1953 season were installed. They are: *President*, Joseph Hollister (Mare Island Naval Laboratory); *Vice-President*, Bill Moser (Pacific Tire); *Secretary*, Halsey Burke (Burke Rubber); *Treasurer*, Gene Gador (Oliver Tire). Bill Moser acted as chairman of the Christmas Party Committee. He was assisted by Miss Ruth Hatch (Pacific Tire), Ted Liljenwal (Pacific Tire), Grover Ramsey (Grove Controls) and Deke Maddy (Harwick Standard).

SOUTHERN OHIO RUBBER GROUP

Approximately 285 members and guests of the Southern Ohio Rubber Group attended the Sixth Annual Winter Meeting held on December 13th, 1952, at the Miami Valley Golf Club, Dayton, Ohio. The program consisted of dinner, dancing and a program of entertainment. It has been announced that officers for the 1953 season will be: *Chairman*, George Lang (Johnson Rubber); *Treasurer*, Bill Noland (Inland Mfg.); *Secretary*, Russ Hoskins (Inland Mfg.). Stew Brams (Dayton Chemical Products) has been named chairman-elect. Dayle Buchanan, Frank Newton and Bert Stangor were named directors. Hold-over directors for a two-year term include the Messrs. Nolan and Brubaker and Poffenberger. Hold-over directors for one-year include the Messrs. Hickernell, Whittaker and Appleby. Jack Feldman was named director ex-officio. The Christmas Party Committee consisted of Ed Cunningham, Dick Hempelman, Harry Brubaker, John Shrontz, Dan Meyer, Joe Holmes, Bob Kraus, Bill Bolin and Ralph Appleby.

Fremont Rubber Strike Ends

Four hundred employees of the Fremont Rubber Co., Fremont, Ohio, have obtained wage increases ranging from 12 to 14 cents hourly in an agreement signed on December 15. The signing of a new contract between the concern and Local 441 of the United Rubber Workers, C.I.O., ended a nine-week strike. In addition to wage increases, the contract provides for a new incentive plan.

BRAZILIAN DUNLOP PLANT MAY START OPERATIONS IN MID-1953

The Brazilian tire and rubber products factory now being constructed by the Dunlop Rubber Co. at Campo Grande, near the city of Campinas in the state of Sao Paulo, is expected to start its operations about the middle of 1953, according to advices reaching this country. Capital investment, at the start of manufacture, will amount to approximately 200 million cruzeiros (about $10,000,000).

The factory will cover an area of 25,000 square meters at the beginning, but the company's property covers a total area of 230,000 square meters, which will leave room for future expansion. The factory will employ 400 to 500 persons, and will operate entirely with English rubber and tire-making equipment and machinery of the latest type.

John H. Lord, executive director of the Dunlop Rubber Co., on a recent visit to Sao Paulo to inspect the Dunlop Brazilian project, stated that the line of manufacture being prepared for the new factory would include tires and tubes for automobiles, trucks, buses, motorcycles and bicycles. A progressive expansion program will be planned, he said, with the addition of other lines of the most varied types.

The Brazilian Dunlop plant, it is understood, plans to consume Brazilian rubber to the greatest possible degree. Dunlop is no newcomer to Brazil, where it has maintained a branch office since 1913. The plant under construction, however, is its first project for local manufacture.

Williamson Moves to New Plant

Williamson Adhesives, Inc., long-established in Chicago as a manufacturer of industrial adhesives, has moved into a modern new plant at Skokie, Ill., northwest of the Chicago city limits. This is the firm's third move in thirty-eight years. The new plant is a concrete and brick structure which more than doubles the manufacturing facilities of the old plant and also provides much larger office quarters. Additional ground area provides for future expansion. The new building also houses the Williamson Specialty Compounding Division. This is an important new division of the firm engaged in the development of new products, and in the processing, handling, packing and shipping of special materials. The new plant includes a well-equipped laboratory for adhesive research and production control, a fireproofed room for processing inflammable products, and greatly increased storage space for raw materials.

A.B.C. Rubber Hit By Fire

The plant of the A.B.C. Rubber Co. at 1451 Sangamon St. in Chicago, Ill., was wrecked by a fire on December 13 which caused approximately $25,000 worth of damage. Freezing temperatures made fire fighting difficult, causing spray from hoses to freeze. An explosion attributed to an overheated boiler blew out portions of a wall, damaging adjacent property.

NATIONAL RUBBER MACHINERY CONSTRUCTS NEW OFFICE BUILDING

Construction of a new, modernistic office building has been completed by the National Rubber Machinery Co. at Clifton, N. J. Located next to the Clifton factory, the office building will house all Clifton production offices, as well as the eastern rubber and plastics machinery sales offices, formerly located in Newark, N. J. Space formerly occupied by the factory production offices has been converted into additional production space. The new offices are seen in the center foreground of the photograph above which was taken recently.

Beebe Named to Japanese Post

Paul Beebe, formerly manager of process development for the Goodyear Tire & Rubber Co., was scheduled to leave for Japan during January to be production manager of the Goodyear "K. K."—Japanese designation for the Goodyear Co., Inc., at Kureme. Kureme is sixty miles northeast of Nagasaki and 800 miles southwest of Tokyo on the island of Kyushu. Mr. Beebe will succeed J. J. Hartz as production manager covering the manufacture of Goodyear products. The company has a manufacturing agreement with the Bridgestone Tire Co. of Japan. Mr. Beebe is a graduate of Albion College and obtained his master's degree from Amherst College, where he studied chemistry and chemical engineering. Mr. Beebe joined the Chemical Engineering Department of the company in 1917. After five years he was transferred to compounding and in 1928 was assigned to the California plant as chief chemist. He has been manager of process development since 1935. Mr. Beebe is a member of Sigma Nu fraternity, Delta Sigma Rho and the American Chemical Society.

Park Rubber Company Formed

The formation of the Park Rubber Co., Inc. with offices and plant at Lake Zurich, Ill., has been announced. The new company is the result of a merger between the Rubber Engineering and Chemical Co., Lake Zurich, and the Park Rubber Corp. of Melrose Park, Ill. The merger provides enlarged engineering and sales staffs and also increases production facilities. Products of the new company will be principally molded mechanical rubber goods and clicking machine pads and blocks for the shoe industry. Officers of the new company are George M. Field, Jr., president; Robert T. Duffy, Jr., Henry J. Droba and Fred Fuller, vice-presidents; and Herbert B. Hill, secretary.

"Grip-Tred" Truck Snow Tire

Goodyear Tire & Rubber Co. has announced a new snow tire specifically designed for light trucks. Designed to give superior traction on snow, ice and other slippery surfaces, its tractive qualities are said to be far superior to conventional truck tires. The tread of the tire, called "Grip-Tred," is composed of hundreds of sharp-edged cleats which bite into loose or hard-packed snow to provide extra grip. The cleats are flexible and perform individually in keeping the tread clean. They are also pitched so as to give traction regardless of the direction of motion. Other features pointed out by the company include a wider, flatter tread. This places more rubber on the road, gives foothold and helps to prevent irregular wear. The tread is triple-grooved to resist side-slipping and the tread has an indented shoulder design for extra grip. The Grip-Tred is a companion tire to the firm's passenger car type, the "Suburbanite," previously announced. The new tire is manufactured in sizes of 15, 16 and 17-inch diameters and is designed for light trucks, especially the delivery types and the light units used on farms.

General Tire Names Harwick

The Chemical Division of the General Tire & Rubber Co. has named the Harwick Standard Chemical Co. of Akron, Ohio, as sales agents for the sale of the following products: "Actogen"—an accelerator-activator; "Ko-Blend I. S."—a latex compounded masterbatch; and "Gen-Tac Resin"—for fabric dips. Harwick Standard will cover all of the United States with the exception of the West Coast and all of Canada. The Chemical Division of General Tire will continue to make all shipments and issue invoices. However, all future orders, requests for samples and information should be addressed to Harwick Standard.

NAMES IN THE NEWS

FRED W. FRALEY, formerly assistant administrator in charge of the Chemical, Rubber and Forest Products Bureau of the National Production Authority, has returned to his position as vice-president of the Diamond Alkali Co.

J. H. BRUUN, formerly associated with the General Aniline and Film Corp., has joined the Hooker Electrochemical Co. as director of research.

EARL H. SCHAUB, formerly Boston division sales manager of the General Tire & Rubber Co., has been promoted to manager of new distribution with headquarters in Akron.

CHARLES W. POOLE has joined the Ferro Chemical Corp., Bedford, Ohio, as chemical engineer in charge of plastic stabilizer development.

F. R. EYER, previously manager of government sales for the General Tire & Rubber Co., has been transferred to the company's San Francisco office on special assignment.

R. M. HORNBECK, general purchasing agent for the Westinghouse Air Brake Co. since 1946, has been named director of purchases succeeding H. W. Wolfe, who recently retired as vice-president in charge of purchases.

MAX A. MINNIG, vice-president of the Rubber Chemicals Division of the Witco Chemical Co., has been elected by the directors of the Continental Carbon Co. and the Continental Oil Black Co. as vice-president in charge of sales for these two companies.

HAROLD W. BURKETT, treasurer of the U. S. Rubber Reclaiming Co., and A. M. ADAMSON, treasurer of Canadian General Tower, Ltd., have been elected to membership in the Controllers Institute.

FRED B. GETTEN, active in the rubber field for the past 18 years, has been appointed manager of the Dallas, Texas, branch of the Pioneer Rubber Mills, San Francisco, Calif.

ARTHUR N. SUDDATH, formerly vice-president in charge of sales and production activities for the James H. Rhodes Co., has been named manager of the new Abrasive Division of Whittaker, Clark & Daniels, Inc., New York, N. Y.

ROBERT T. SMITH, associated with Whittaker, Clark & Daniels, Inc., New York, N. Y., for the past 19 years, has been named executive salesman of the company.

B. BEVERLY WRIGHT, vice-president of the O'Sullivan Rubber Corp., Winchester, Va., has been elected to the board of directors of the company.

FRANK ZVANUT, formerly ceramic engineer for the Ferro Corp., Cleveland, Ohio, has been named sales engineer for the Georgia Pigment Co., newly-acquired subsidiary of Godfrey L. Cabot, Inc., Boston, Mass.

ROBERT H. NAYLOR, previously assistant general credit manager for the Goodyear Tire & Rubber Co., has been promoted to general credit manager succeeding G. L. WEBSTER, who recently retired.

FRANK G. MOORE, who has served as traffic manager for the Columbia-Southern Chemical Corp. and its predecesor companies since 1934, has been appointed general traffic manager of the company.

PATRICK W. FREMONT, previously comptroller for the Carlisle Tire & Rubber Co., and associated with the Glyco Products Co. for the past eight years, has been appointed assistant vice-president in charge of finance by the latter company.

DAVID W. NURSE, formerly factory sales manager of the Hazard Insulated Wire Works Division of the Okonite Co. at Wilkes-Barre, Penna., has been named superintendent and resident manager succeeding RAYMOND MANSON EATON, who retired on December 31, 1952, after 45 years with the company.

M. ADOLPH HEIKKILA, formerly engaged in sales promotion for the plastics, paint, chemicals, building, heating, and air-conditioning fields, has joined the Technical Literature Department of Ketchum, MacLeod & Grove, Inc., Pittsburgh, Penna., advertising agency.

ARTHUR H. KRAUSE, formerly associated with the Marbon Corp., has joined the Research and Development Department of the Kentucky Synthetic Rubber Corp.

ROBERT D. THOMAS, associated with the Firestone Tire & Rubber Co. since 1931, has been appointed Central Division Sales Manager.

LYALL TRACY, on leave from Rayonier, Inc., has been named assistant administrator of the National Production Authority, in charge of the Chemicals, Rubber and Forestry Bureau, succeeding FRED W. FRALEY, who has returned to his post with the Diamond Alkali Co.

LOUIS J. HEALEY, formerly Pacific Coast sales manager for the Footwear and General Products Division of the U. S. Rubber Co., has been appointed sales manager of general products for the division.

WILLARD D. VOIT, president of the W. J. Voit Rubber Corp., has been honored with a business achievement award presented by *Minute Magazine* of Los Angeles, for exceptional achievements in the business world.

Improved Carbon Black Container

The problem of shipping carbon black, especially to foreign plants, is said to have been solved by an improved container developed by the Firestone Tire & Rubber Co. and the Witco Chemical Co. Since carbon black is essential in the manufacture of tires and other rubber products, Firestone and Witco collaborated in the development of a fiberboard carton which supports an inner bag of compressed carbon black weighing 50 pounds. The compressing of the black removes the air from the package and forms a briquette of black, which, because of its density, helps to support the package. The rectangular shape of the fiberboard outer container resists punctures and is easy to handle. If a puncture does occur, the compressed black does not flow out of the rupture as it previously did when it was loosely packaged in bags alone. A trial shipment, using both the old and new methods of packaging the black, recently was made to the Firestone plant at Port Elizabeth, South Africa. The opinion of the terminal operators, stevedores, shipping companies and the consignee was that the new container far surpassed the old method of shipment and handling in every way. Firestone plans to use the new container for future carbon black shipments to its many overseas plants.

Detroit Plans Panel Discussion

The Detroit Rubber and Plastics Group has announced that its February 13, 1953, meeting will consist of a panel discussion on "Adhesive Application Problems in the Automobile Industry." J. T. O'Reilly (Ford) will act as moderator, while the panel will consist of the following: A. J. Carter (Chrysler), S. Adinoff (St. Clair Rubber), C. L. Stachel (U. S. Rubber), J. Forsyth (GMC), G. Lindner (Minnesota Mining), and J. Clark (Packard).

MISS L. J. BAXTER has been named director of the Customer Service Department of the American Polymer Corp., Peabody, Mass.

GEORGE W. SCHWARZ, since 1948 vice-president and controller of the Wyandotte Chemicals Corp., has been promoted to vice-president and treasurer of the firm.

DALE J. GASCH, formerly associated with the Queen City Tulatex Corp., recently joined the American Excelsior Corporation, Grand Rapids, Mich., as technical director.

PAUL E. NELSON, Akron Division sales manager of the General Tire & Rubber Co. for the past two years, has been promoted to the new position of manager of fleet and national sales.

WALT WESTMAN, formerly associated with the National Sponge Cushion Co., has joined Los Angeles Standard Rubber, Inc., Los Angeles, Calif., in charge of compounding and the development laboratory.

1951 Sulfur Output Increases

According to the Bureau of Mines, during 1951 the sulfur industry was primarily concerned with solving the shortage problem which had developed in the previous year. Production of Frasch sulfur increased to a record 5,278,249 long tons, 2% more than in 1950. Sales, however, were lower than in the previous year because producers' stocks had been reduced to such a low point that further drafts upon them were considered to be unwise. During the year, stocks in producers' hands increased 7%. Domestic output of pyrites increased during 1951 as did the output of the various byproduct forms such as smelter acid, recovered sulfur, hydrogen sulfide and sulfur dioxide. Pyrite increased to 9%; smelter acid to 11%, and other byproduct sulfur compounds, 42%. Total sulfur production in all forms increased from 5,986,482 long tons in 1950 to 6,196,859 in 1951. International trade in sulfur continued to be an important factor. Foreign demand was greater than United States sources could supply and exports declined from 1,478,522 long tons in 1950 to 1,311,817 in 1951. The year was particularly noteworthy for the vigorous production expansion programs that were initiated both in the United States and abroad. As a result of these programs, it is anticipated that total output of sulfur will increase considerably in the next year or two.

Hale and Kullgren Names Two

Hale and Kullgren, Inc., Akron, Ohio, has announced the appointment of Fred Wachter as sales manager for the National Erie Division of Hale and Kullgren, and Paul H. Rossiter as engineer for the same division. Prior to joining Hale and Kullgren, Mr. Wachter was sales engineer for the National Erie Corp. for twelve years, covering all National Erie products in the rubber and plastics field. Mr. Wachter was also associated with the Reeves Brothers Division of Chicago Bridge and Iron Co. Before going to Chicago Bridge and Iron, Mr. Wachter worked for the Blaw-Knox Co. in their Processing Equipment Division and for the Treadwell Engineering Co.

Mr. Rossiter joined Hale and Kullgren in March, 1952. He was in charge of design engineering at National Erie for eight years. Before joining National Erie, Mr. Rossiter was in charge of all mechanical installations and machine designs for special equipment for Pan American Airways in Central America, South America and the West Indies.

Cowan Announces Retirement

Martin I. Cowan has announced his resignation as secretary and treasurer of the Consolidated Products Co., Inc., New York, N. Y., and his retirement from the firm. He had been affiliated with the concern for thirty years. His son, Robert C. Cowan, will continue to serve as sales engineer with Consolidated Products. Mr. Cowan plans to continue his association with the chemical and allied processing industries as a consultant, advisor and appraiser.

FINANCIAL NEWS

Firestone Tire & Rubber Co.

Year Ended October 31: Net income of $43,081,717, which is equal to $10.89 a common share, compared with $48,398,950, or $12.26 a share, for the previous fiscal year. Net sales for the 1952 fiscal year amounted to $965,364,427, against $975,766,455 in the 1951 fiscal year. Lower earnings were attributed to a reduction in the world market price of natural rubber sold by the company's Liberian plantations and to higher wages and other operating costs. These higher factors were tempered by a decrease in taxes, as the parent company was not subject to excess profits tax in 1952. Net working capital, bolstered by the sale of $75,000,000 of twenty-five year debentures in May, 1952, totaled $288,231,430 on October 31, 1952, against $201,158,456 in the previous fiscal year. Additions to and improvement of plants and equipment cost $42,951,683 in 1952.

Armstrong Rubber Co.

Year Ended September 30: Net income of $1,651,802, which is equal to $4.05 a share on the combined Class A and Class B common stock, compared with $2,832,393, or $7.28 a combined share, in the previous fiscal year. Net sales in the 1952 fiscal year totaled $55,436,947, against $50,325,336 in the 1951 fiscal year.

Plastic Wire & Cable Corp.

Year to September 27: Net profit of $413,983, which is equal to $3.81 a share, compared with $269,524, or $2.71 a share, in the previous fiscal year. Net sales in the 1952 fiscal year amounted to $9,398,829, against $6,060,252 in the 1951 fiscal year.

Tracy Succeeds Britton at Enjay

Osgood V. Tracy, formerly general manager of the Chemical Products Department of the Esso Standard Oil Co., has been elected president of the Enjay Co., Inc., succeeding John A. Britton, Jr., president of Enjay since 1948, who plans to retire in 1953. Mr. Britton will continue with the company as a director and advisor on sales until his actual retirement. Mr. Tracy recently returned to the company from a leave of absence as director of the Chemical Division of the National Production Authority. He has been a director of Enjay and was formerly operations head of the Standard Oil Development Co. and manufacturing coordinator of chemical products for Esso. Mr. Britton has been associated with Esso and affiliated companies since 1920 and subsequently became head of additives and synthetic rubber sales. He is a member of the Society of Automotive Engineers, Oil Trades Association of New York, and the American Petroleum Institute, in which he is also a member of the 25-Year Club.

Trust Suit Ended by Consent

The U. S. Department of Justice on December 3 announced an anti-trust consent judgment against the United Engineering and Foundry Co. of Pittsburgh, Penna., "terminating international cartel agreements in the manufacture and sale of rolling mill machinery and equipment." The department said the judgment was entered in the Federal District Court in Pittsburgh, closing a government suit against the company filed in June, 1950. United Engineering was charged in the action with making agreements with thirteen foreign companies under which the world was divided into marketing territories. The December 3 decree, the department said, enjoins the company from making such agreements. Further, United Engineering, upon furnishing its "know-how" to a foreign manufacturer in the future, is to give the manufacturer the right to compete with United Engineering in this country. The department said the judgment "removes the private barriers created by the defendant and thirteen foreign manufacturers which established a rigid international marketing structure and seriously impeded in all important markets of the world the free flow of critically important machinery and equipment.

Monsanto Plant Widens Output

The Texas City, Texas, plant of the Texas Division, Monsanto Chemical Co., has started production and regular shipments of vinyl chloride monomer. The vinyl chloride monomer is being made from acetylene, hydrochloric acid, ethylene and chlorine, and will be shipped in tank cars, and in small and intermediate size pressure cylinders. Ethylene dichloride is produced as an intermediate in the vinyl chloride process. Productive capacity of the Texas City plant will be large enough to allow marketing of ethylene dichloride as well as the monomer. A portion of the plant's production is going to the company's Plastics Division with plants at Springfield, Mass., and Port Plastics, Ohio, where it is converted into polyvinyl chloride and a number of copolymer resins. The on-stream production of vinyl chloride is the second step of the current three-way expansion of the Texas City plant. The first step was completed last July when shipments of styrene monomer were started.

Reichhold Announces Appointments

Reichhold Chemicals Inc., Detroit, Mich., has announced the appointment of Donald G. Patterson as technical assistant on resins and plastics to Henry H. Reichhold, chairman of the board. It was also announced that Archie H. Dean has been named sales manager of the new Specialty Products Division. Mr. Patterson will establish liaison between the company's plants and laboratories. For the last fifteen years he has been in charge of plastics deevlopment at the research laboratories of the American Cyanamid Co. Mr. Dean, prior to joining Reichhold, was director of sales for the Barrett Division of the Allied Chemical & Dye Corp.

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A Word About the Author—

Dr. Royce J. Noble is a well-known consulting chemical engineer and an outstanding expert on latex. He has been intimately associated with latex technology for the past 30 years and has served with one of the leading suppliers of latex compounds and compositions in a technical and executive capacity. During World War II he was associated with the Chemical Warfare Service as a Colonel engaged in both rubber and latex problems. He is eminently qualified as the author of this comprehensive text book on latex and its applications.

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Signal Corps Symposium Held

Approximately 450 persons attended the technical symposium on "Technical Progress in Communication Wire and Cables" which was sponsored by the Coles Signal Laboratory of the Signal Corps Engineering Laboratories, Fort Monmouth, N. J., on December 8, 9 and 10 at the Berkeley-Carteret Hotel in Asbury Park, N. J. Representatives from wire and cable manufacturing concerns, crude rubber and raw material vendors, college instructors and sales representatives attended the symposium.

Major General K. J. Lawton, commanding general of Fort Monmouth, delivered the welcoming address on December 8. Other introductory remarks were made by Brigadier General E. R. Petzing, commanding general of the Signal Corps Engineering Laboratories, who spoke of the laboratories functions with regard to wire and cable. Dr. H. Zahl, director of research at the laboratories, spoke on research activities on wire and cable, while Colonel Robert G. H. Meyer, director of the Coles Signal Laboratory, spoke on the aims and the program of the symposium. The symposium was so successful that Signal Corps authorities are speaking of making it an annual affair. Among the approximately 30 papers delivered at the symposium, the following are of direct interest:

"Styroflex" by G. M. Dinnick and J. Burton (Naval Research Laboratory).

"Polyethylene Pulse Cables" by F. A. Miller (Federal Telecommunications Laboratories).

"Neoprene Jacketed Drop Wire" by C. C. Lawson (Bell Telephone Laboratories) and A. N. Gray (Western Electric).

"Teflon Resin as a Wire and Cable Insulator" by B. E. Ely (DuPont).

"Properties of Fluorothene Insulated Wire" by A. E. Maibauer and W. Canavan (Bakelite).

"Moisture Resistance of Insulated Conductors" by R. C. Graham (Rome Cable).

"Observations on the Testing of Fungicides in Neoprene, Vinyl and Varnish Covered Electrical Wire and Cable" by S. W. Taylor (R. T. Vanderbilt).

"Depolymerized Rubber" by M. Doane (H. V. Hardman).

"Rigid Polyvinylchloride Insulations" by W. D. Crater and M. T. Kleinfeld (Naugatuck).

"The Development of Arctic Rubber Insulations and Jackets" by W. H. Dibble (U. S. Rubber).

Frisco Named Factory Manager

Vulcan Rubber Products, Inc., Brooklyn, N. Y., has announced the appointment of W. P. Frisco as factory manager. Mr. Frisco was formerly technical director of the St. Clair Rubber Co. He received his B. S. degree in chemical engineering from the Case Institute of Technology and an LL. B. degree in law from the University of Maryland. During his fifteen years in the rubber industry he has been associated with the development and manufacture of insulated wire and cable, molded mechanical goods and coated fabrics.

Enters Petrochemical Field

Semet-Solvay Division of the Allied Chemical & Dye Corp., New York, N. Y., has entered the petrochemical market with the introduction of a new material from ethylene called "Alcowax." A full-scale petrochemical plant is under construction at Buffalo, N. Y., where Alcowax is now being produced on a small plant scale. It is reported that unlike most other polymers of this type the present grade of Alcowax has wax-like hardness and a melting point of approximately 100° C. The company states that the material is hard, of white translucent color and is tasteless, non-toxic and substantially odorless. It is said to have a melting point higher than that of the natural waxes, against a moderately low melt viscosity, so that it is readily dispersible in various types of waxes and other mediums at moderately low temperatures. Alcowax will be of interest to the rubber industry due to its anti-blocking characteristics which should make it an excellent separator when stacking sheet rubber. Another grade of Alcowax, an emulsifiable type, finds use in combination with latices in paint, textiles and paper.

All-Purpose Livestock Trough

An all-purpose rubber livestock trough that will not tip over, break, rust or cause injury to livestock has been developed by the Goodyear Tire & Rubber Co. and is being manufactured in its Los Angeles, Calif., plant. The specially designed circular troughs resemble an old-fashioned wash tub in construction but are made of tough fabric and high quality rubber. Meant to be used as a container for water, salt, feed or supplements, the trough's greatest advantage over present feed dispensers is that it is practically indestructible. It is crush proof and has unusual weather resistance. Of smooth-surface design to prevent being turned over by animal horns, the Goodyear trough is flexible enough to remain upright when the sidewall is stepped on by a heavy steer or horse. At present, the rubber trough is being manufactured in only two sizes. One holds 100 pounds of salt or feed, the other 50 pounds.

VINYL SPECIALTIES

S & S Distributing Co., New York, N. Y., has introduced "Typak," a new handy tie rack and envelope both made of Vinylite plastic. Specifically designed for travel, Typak protects ties from creasing, dust, dirt and moisture.

Velon molded drapery material is being used by the Avon Curtain Corp., New York, N. Y., in the manufacture of a new line of draperies called "Keystone." The draperies offer subtle color combinations in a wide range.

Blaine Co., Inc., New York, N. Y., has introduced a new 16-inch world globe made of Vinylite plastic. The map of the world is reproduced on the inflated globe in five bright and attractive colors. A convenient base for the globe is made from the box in which it is packed.

Goodyear Sales Appointments

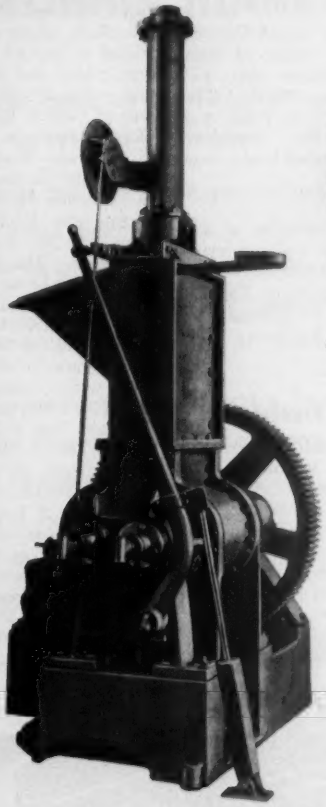
Important organization changes in the sales departments of the Goodyear Tire & Rubber Co. were recently announced. R. W. Fitzgerald has been named sales manager of the Tire Division, while W. A. Kemmel has been appointed manager of the Tire Departments. Mr. Fitzgerald started his career with Goodyear in 1919 as a general line salesman. He later became a truck tire salesman and in 1929 was named truck tire representative in the Northcentral Division. In 1931, he was assigned to truck tire sales for the Chicago district. He was appointed assistant district manager in Chicago in 1934 and a year later was promoted to the Omaha district, where he remained until his appointment as district manager in 1942. He was made Western Division manager in 1946 and became Northcentral Division manager in 1947.

Mr. Kemmel joined Goodyear as a timekeeper in 1915 and later worked as a tire builder before enrolling in the factory squadron in 1919. He completed his squadron training in Los Angeles in 1922 and was named foreman of the squadron the same year. Mr. Kemmel served as night superintendent of the California plant in 1927; transferred to highway transportation that same year and returned to the Akron sales squadron in 1931. Following service as a sales school instructor, in advertising, and on special assignments in retail stores, he was named district manager at Sacramento, Calif., in 1935. He became assistant district manager at Los Angeles in 1937 and was named district manager there the following year. He took over his duties as manager of truck tire sales in 1944.

U. S. Rubber Fiberthin Fabric

Lightweight and tear-resistant tarpaulins for trucks and boats, and other applications are foreseen by the U. S. Rubber Co. for its new "Fiberthin" fabric, which was recently patented. A patent on Fiberthin base fabric and coated fabric has been granted to B. H. Foster of the company's General Laboratories and assigned to the company. Claims have been allowed on both the special grey goods used and on the coated product. At present the company plans to license a sufficient number of weavers and coaters to handle the current demand, with additional license applications to be considered later as demand increases.

Fiberthin is a new base fabric used in the production of high tear-resistant, lightweight, waterproof fabrics. The base fabric is flexible and low-gauge. It is woven of flat, ribbon-like, continuous multi-filament yarns such as nylon, orlon and rayon. It can be combined with coatings of natural rubber, synthetic rubber or plastic. Because of its unusually high tear resistance in proportion to its weight, it has been used for many military applications including airplane wing covers, tarpaulins and other protective coverings. The company anticipates that Fiberthin can be used for all kinds of civilian applications requiring a waterproof fabric or light weight and high tear snag resistance.



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CANADIAN NEWS

Shareholders of Canadian Industries, Ltd., were recently advised that the firm may be divided into two separate companies as a result of an anti-trust action by the United States Department of Justice against two firms which jointly own the concern. E. I. du Pont de Nemours & Co., Inc. of the United States and Imperial Chemical Industries, Ltd. of the United Kingdom were ordered by a United States Federal District Court last July 30 to end their interest in Canadian Industries, Ltd. The court decree provided that this could be done either by sale of stock or by physical division of plants and properties. Both concerns are considering a plan for submission to a United States court by January 30, 1953.

At present, DuPont and ICI each own about 42% of Canadian Industries Common stock. As both concerns desire to continue to do business in Canada, the tentative plan provides that two new companies be formed, with DuPont the principal shareholder in one and ICI in the other.

All preferred shares and about 16% of Canadian Industries common stock are held by the public. Under the tentative plan, the preferred and minority common shareholders would hold stock in each of the two new companies. No appeal against the judgement was filed by the defendants or the U. S. Department of Justice. If the plan is approved by the United States court, it will be placed before Canadian Industries' board of directors. Subsequently, it will be submitted to special general meetings of shareholders called in accordance with provisions of the Canadian Companies Act. If these approve the plan, it then must receive the sanction of a Quebec Superior Court judge and be confirmed by the Canadian Secretary of State.

The United Rubber Workers, CIO-CCL and the Goodyear Tire & Rubber Co. of Canada, Ltd., have ended almost a year of negotiations with an agreement providing for a non-contributory pension of $80 a month and a wage increase of 8c an hour. The agreement covers 2,000 employees. The new pension plan replaces a contributory plan which has been in effect at Goodyear for years. The agreement, retroactive to October, 1952, provides for pensions of $80 a month at 65 after 25 years' service. The 8c per hour wage increase is dated back to November 16 and employees, in addition, receive a payment of $30 to take care of the increase from October 1. Other provisions in the agreement include a total disability clause and severance pay for employees after five years' service. Severance pay is based on 2% of earnings after the fifth year. The union also gained an improvement in union security, which requires all new employees to pay union dues.

Goodyear Tire & Rubber Co. of Canada, Ltd., has announced that prices of tires for most standard passenger cars and trucks will be reduced very shortly. The price cut will also apply to tubes and will range from 2½ to 5%. Company officials said the move reflected lower costs for raw materials.

Allan E. Ross, formerly assistant manager of the Advertising Department of the Goodyear Tire & Rubber Co. of Canada, Ltd., has been promoted to manager of the department.

Joins Ace Rubber Products

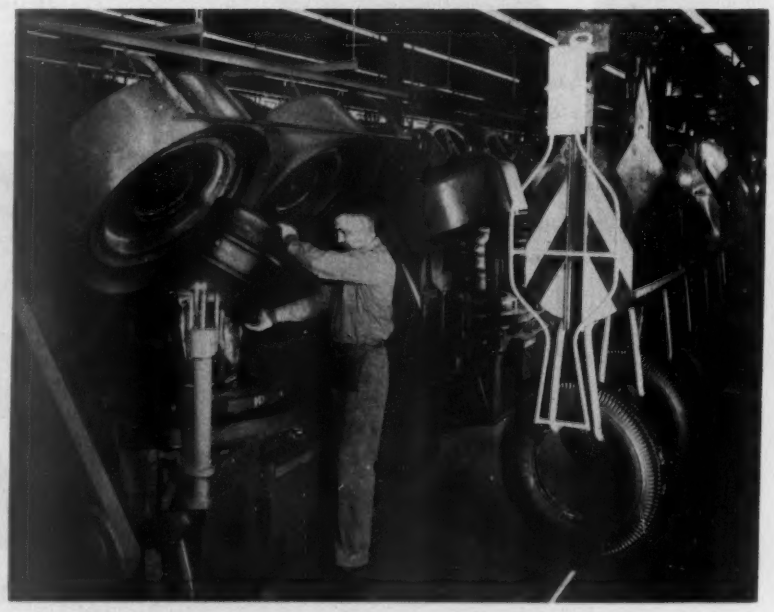
D. Alwyn Stivers, formerly associated with the Goodyear Tire & Rubber Co., has been named chief chemist of Ace Rubber Products, Inc., Akron, Ohio. Mr. Stivers is a graduate of Georgia Tech, where he also did post-graduate work. He was engaged in development and compounding work for several years and served an assignment to install a laboratory for the Goodyear plant in South Africa.

Plans to Buy Roebling Firm

Plans to purchase John A. Roebling's Sons Co., Trenton, N. J., with plants at Trenton and Roebling, N. J., were recently announced by the Colorado Fuel and Iron Corp., the nation's ninth largest steel producer. Colorado Fuel said a wholly-owned subsidiary, which was not named, has contracted to buy all the manufacturing business, plants and inventories of the Roebling company. Charles R. Tyson, president of John A. Roebling's Sons Co., joined Charles Allen, Jr., chairman of the board of Colorado Fuel, in the announcement, which said the purchase was to take place on December 31, 1952. Colorado Fuel will operate the Roebling plants under that name with Mr. Tyson continuing to direct operations. The net depreciated value of fixed assets being purchased was listed as approximately $23,500,000 with inventories of about $17,500,000. The subsidiary which will acquire the Roebling concern will privately place $15,000,000 of first mortgage bonds with a group of insurance companies as part of the financing of the purchase. Colorado Fuel and Iron will sell privately $10,000,000 of its cumulative preferred stock, Series B, and will offer publicly about $5,000,000 of its common stock.

The features and superior performance characteristics of porous hard rubber storage battery separators are described in a new catalog recently issued by the Electrical Wire & Cable Department of U. S. Rubber.

NEW TIRE PRODUCTION LINE INSTALLED AT FIRESTONE DES MOINES PLANT



The year 1952 in the rubber industry was highlighted by extensive modernization and expansion programs, such as this new tire production line in the Des Moines plant of The Firestone Tire & Rubber Co. The automatic units pictured above combine the tire-forming and tire-curing operations and increase the output of finished tires substantially. More than $8,000,000 has been spent on new, modern production facilities by Firestone during 1952 in the Des Moines plant alone. Firestone statisticians report that, because of technological improvements in materials and methods of building tires, today's popular size passenger car tires give more miles of service per dollar than they did in 1945, and provide for greater safety.

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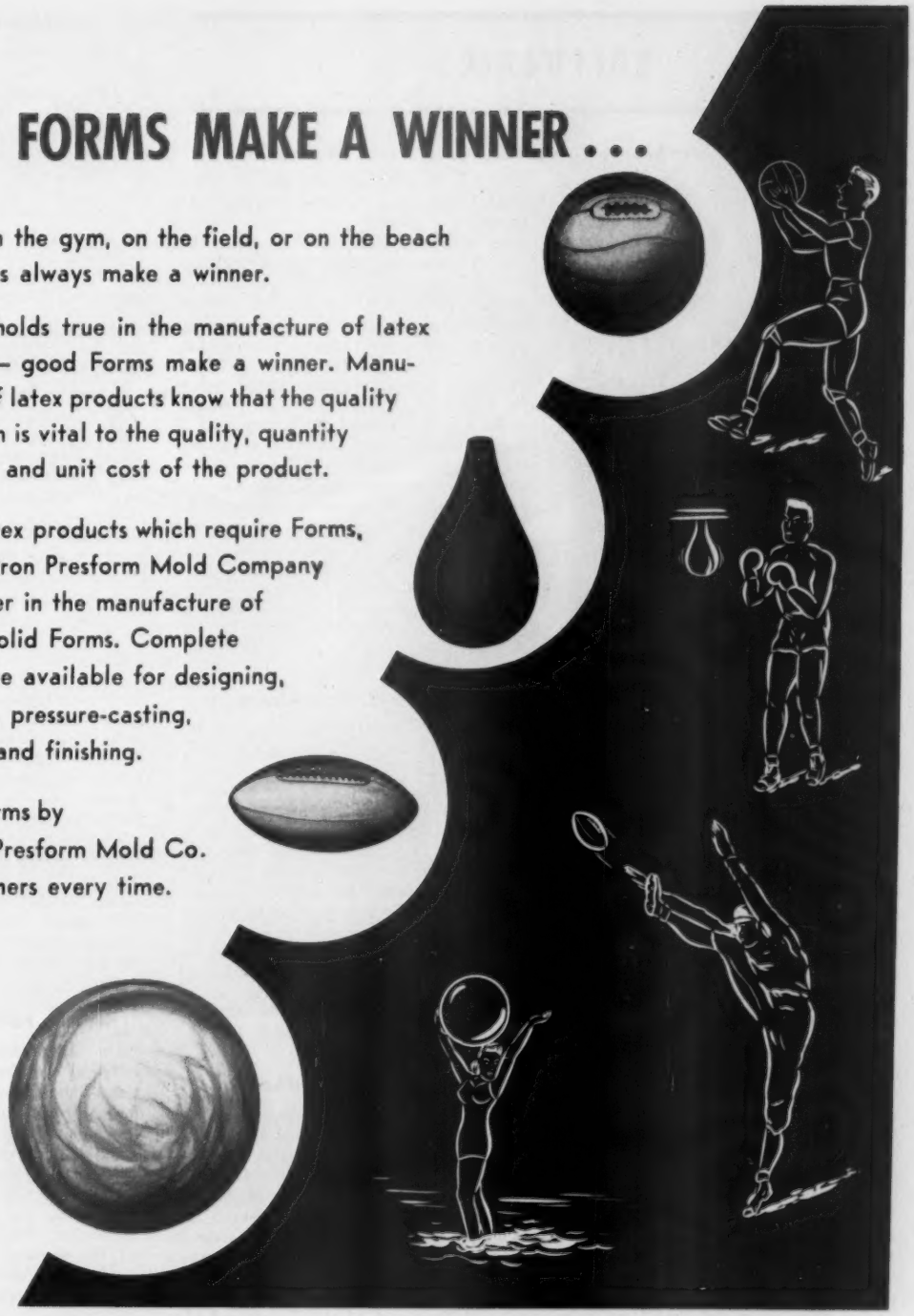

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FORMS	MOLDS	DIES	MACHINERY
LATEX - DIPPING	STEEL AND ALUMINUM	PLASTIC - INJECTION	SPECIAL - AUTOMATIC

OBITUARIES

Thomas J. Starkie

Thomas J. Starkie, vice-president, director and member of the Executive Committee of the Witco Chemical Co., died on December 21, 1952. Born in New York City on December 2, 1892, Mr. Starkie began his career in the chemical field with the Harshaw Chemical Co. and joined

Witco in June, 1921. Mr. Starkie was also a director of the Witco Chemical Co., Ltd. His club memberships included the Uptown Club, the Chemist's Club, the Salesman's Association of the American Chemical Society and the New York and National Paint Clubs. He is survived by his wife, a son and a daughter.

Harvey D. Geyer

Harvey D. Geyer, retired chief engineer of the Inland Manufacturing Division of the General Motors Corporation, died in a hospital in Dayton, Ohio on December 21. He was 61 years old. Mr. Geyer, who held more than 250 patents, was recognized as one of the world's leading authorities in the field of rubber-to-metal applications. While serving as a lieutenant colonel at Edgewood Arsenal during World War II, Mr. Geyer developed a flame thrower with ten times the effective distance of models then in use. He also was credited with having improved phosphorous bombs, grenades and smoke generators. He received the Legion of Merit for his work. After his retirement in 1949, Mr. Geyer served as consulting engineer to Inland Manufacturing and other General Motors divisions.

Max Durst

Max Durst, president of the Franklin Metal and Rubber Co. and of the Keystone Brass and Rubber Co., died on December 19 at his home in Philadelphia, Penna. He was 62 years old. He is survived by his wife and three sisters.

Fred J. Wilson

Fred J. Wilson, retired president of the Wilson Rubber Co., Canton, Ohio, died on December 6 at Mercy Hospital in Canton after an illness of several months. He was 75 years old. Mr. Wilson began in the rubber business 59 years ago at the B. F. Goodrich Co., where he advanced to the position of foreman. In 1904, Mr. Wilson joined the Canton Rubber Co., Canton, Ohio, as superintendent, and in 1911 was namesd assistant superintendent of the Faultless Rubber Co. of Ashland, Ohio. A few years later he returned to Canton where he was one of the organizers of the Wilson Rubber Co. He was elected president of the company bearing his name in 1926. Mr. Wilson was a director of the Stark Federal Savings and Loan Co., and a member of the National Association of Manufacturers, the Canton Chamber of Commerce, the Rotary Club and the Canton Automobile Club. He also was an active Mason. Mr. Wilson leaves his wife and three sons.

Elmer C. Croakman

Elmer C. Croakman, president of Binney & Smith, Ltd., Toronto, Canada, covering the Canadian territory, died on December 25, 1952. He was 54 years old. Mr. Croakman was previously associated with the Philadelphia Rubber Works Co. in Akron, Ohio, until it was taken over by the B. F. Goodrich Co. In 1946, Mr. Croakman assumed the presidency of Binney & Smith, Ltd., a position he held until his death. He was a graduate of the University of Buffalo. Services were held in Toronto with interment in Buffalo, N. Y. Mr. Croakman leaves his wife, a daughter and his son Carl, a sales representative for Binney & Smith, Ltd.

Edwin W. Oldham

Edwin W. Oldham, who retired two years ago from the Firestone Tire & Rubber Co., where he had been in charge of the general laboratory, died in City Hospital in Akron, Ohio on December 20. He was 74 years old. Born in Akron, Mr. Oldham was graduated from the Case Institute of Technology in 1900. He was a member of the American Chemical Society and was past-president and secretary for twelve years of the Coventry Lodge, F. & A. M. in Akron. Mr. Oldham leaves three sons and a daughter.

W. Howard Barney

W. Howard Barney, former vice-president and general manager of the Collyer Insulated Wire Co. of Pawtucket, R. I., died on September 16 after a long illness. Mr. Barney retired from his position with Collyer Insulated Wire in 1949 after 25 years of service. Before that he was with the Bourne Rubber Co. of Providence, R. I., as general manager.

Herbert I. Scott

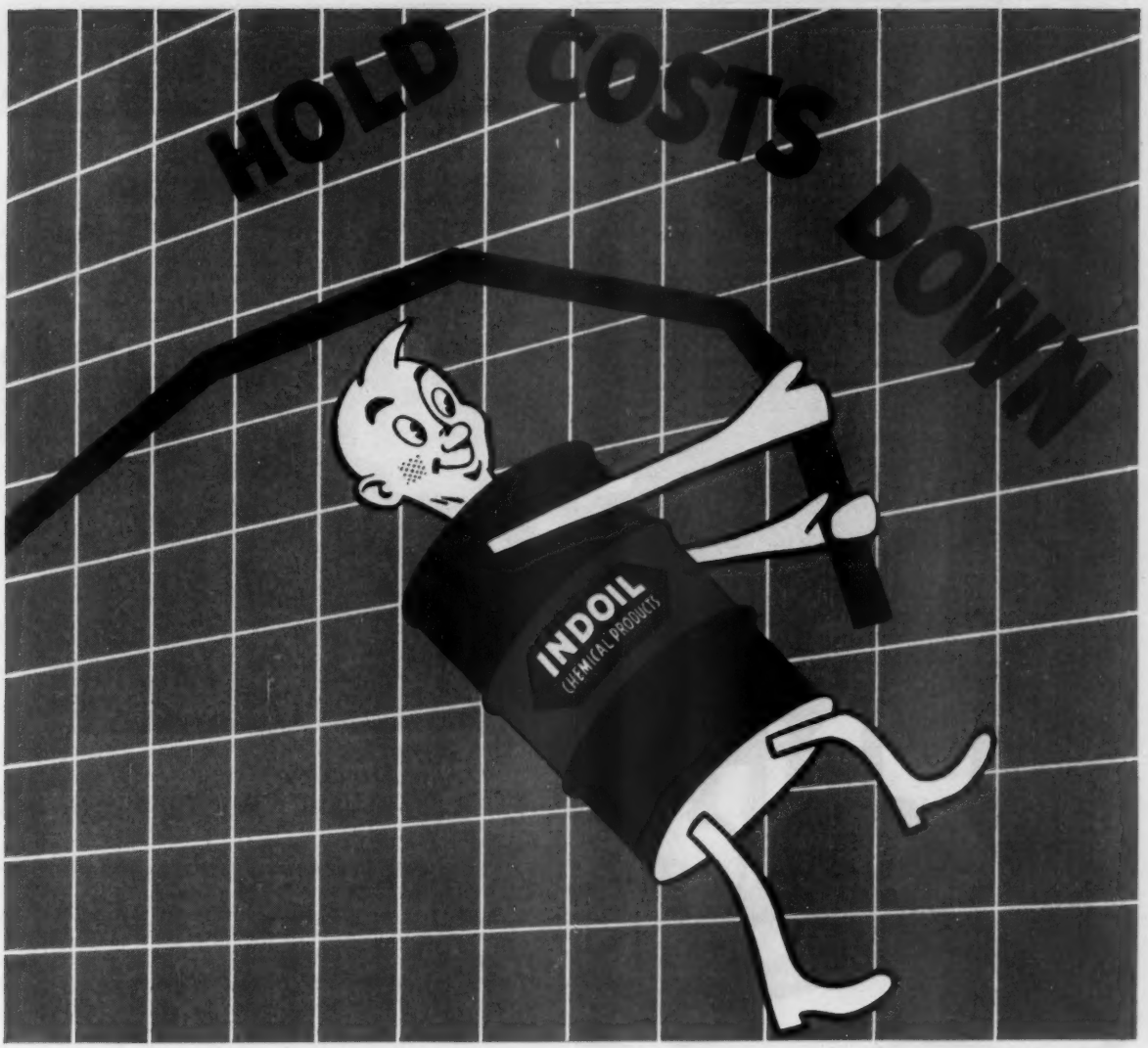
Herbert I. Scott, treasurer of the Barr Rubber Products Co., Sandusky, Ohio, and formerly associated with the Goodyear Tire & Rubber Co., died on December 11 in Sandusky. Mr. Scott entered the rubber field with Goodyear in 1913 as an accountant. He became assistant credit manager and later took a position with the Faultless Rubber Co. in Ashland, Ohio. With the late Nelt Barr, he started Barr Rubber in Lorain, Ohio, later moving the firm to Sandusky. Services were held on December 14 in Sandusky.

Buys Two Machine Tool Concerns

Columbia Machinery and Engineering Corp. has acquired all of the assets and manufacturing rights of the Bridgeport Safety Emery Wheel Co., Inc., of Bridgeport, Conn., and the Diamond Machine Co., of Stratford, Conn. The acquisition of the two machine tool concerns climaxed several months of negotiations, and it was reported that the companies were purchased for cash. Columbia Machinery plans to integrate the two Connecticut companies, for the time being, with its Hamilton, Ohio, division. Columbia Machinery will continue the manufacture of the full Bridgeport line of medium and heavy hydraulic face grinders, vertical spindle surface grinders, knife grinders, pedestal grinders and abrasive cut-off saws. For the present, Columbia Machinery activities in connection with the Diamond company will be limited to field service. Columbia Machinery presently is one of the leading designers and builders of heavy power squaring shears and bending brakes, low and high pressure hydraulic laminating presses and other special equipment. The company expects to increase its volume approximately 50% by the addition of the Bridgeport line.

Hercules Powder Promotes Schultz

Dr. Raymond F. Schultz, formerly technical director of the Experiment Station of the Hercules Powder Co. has been named special assistant to the director of research. Dr. Peter VanWyck, previously associate technical director of the Experiment Station, has been named station director. Dr. Schultz had been technical director of the Experiment Station since November, 1951, and had been director of the research center before that since 1945. Dr. Schultz became associated with Hercules Powder in 1941. A native of Wisconsin, he attended the University of Wisconsin where he earned a B.S. degree. He received masters and Ph.D. degrees at Harvard University in organic and physical chemistry. Dr. VanWyck has been associate technical director of the Experiment Station since January, 1952. He has been associated with Hercules Powder since 1930. He is a graduate of Cooper Union Institute of Technology and received his M.S. and Ph.D. degrees from Rensselaer Polytechnic Institute. Dr. Howard G. Tennant, manager of the Experiment Station, continues in that post reporting to Dr. VanWyck.



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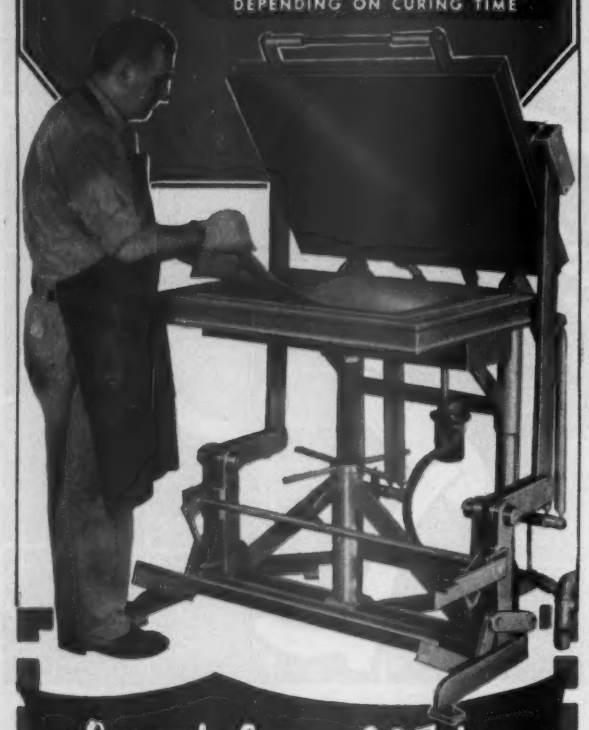

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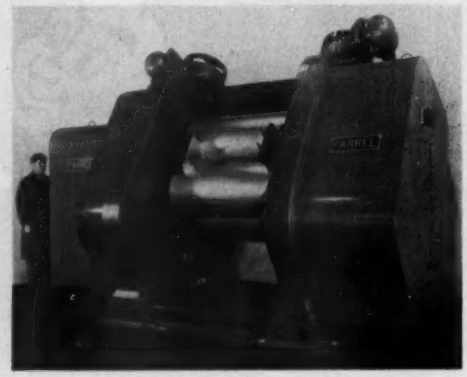
NEW EQUIPMENT

F-B Three-Roll Tri-Angular Calender

Improved accuracy of gauge control is said to be provided in a new three-roll calender developed by the Farrel-Birmingham Co., Inc., Ansonia, Conn. Called the Tri-Angular Calender, its basic design, together with a choice of sizes and optional features, is reported to ideally suit the unit for any type of calendering process requiring two passes.



The new Tri-Angular F-B calender provides improved accuracy of gauge control.

A primary advantage of the new calender is the right-angle arrangement of the three rolls, which isolates the separating forces. With only two rolls in any plane there is no pressure from a third roll to affect roll settings and cause fluctuations in gauge. Hydraulic pullback cylinders effectively hold the rolls in their operating positions, eliminating backlash in the boxes and adjusting screws. An attendant benefit resulting from the roll arrangement is the improvement of feeding conditions to the calender. The angle of the rolls provides better support to the feed bank, and the bank and guides are easily accessible from floor level.

The standard Tri-Angular calender has mechanical lubrication, but for high-temperature operation a flood-lubrication system can be specified. Other optional features include rolls drilled longitudinally beneath the working surface for the most effective temperature control, a motorized crossed-axes device for fine adjustment of roll "crown" on the gauging pass, and the Farrel "Uni-Drive."

The "Uni-Drive" separates the drive and connecting gears from the calender entirely. They are enclosed in a separate, fabricated steel housing, and are connected to the rolls of the calender by universal spindles. The "Uni-Drive" eliminates gear maintenance and provides smooth, efficient power transmission under varying torque loads.

The angular roll arrangement and other available features, while new to the three-roll calender, are in no way experimental, all having been most successfully proven by the Farrel four-roll "Z" calender which is widely used for calendering plastic and rubber products.

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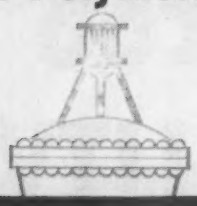

4 NEW RESINS FOR INDUSTRY

POLYCO 500

Vinyl chloride copolymer emulsion pre-plasticized. Deposits tough, flexible films with excellent resistance to heat, solvents, light. Excellent adhesion to fabrics, metals, paper, etc., high gloss. Suggested uses: Coating fabrics, yarns, paper, saturation of non-woven fabrics, water-based printing inks, bronze printing compounds. Data Sheet P-45.

POLYCO 497

An alkali-soluble vinyl acetate copolymer in aqueous dispersion. Deposits clear, hard, water-repellent films from aqueous media. May be dissolved in ammonia or other alkalis to obtain clear, viscous solution. Suggested uses: Textile sizings, adhesives, coating and saturant for paper and non-woven fabrics. Data Sheet P-39.

POLYCO 438

An excellent low cost plasticizer for polyvinyl acetate. Imparts deeper penetration, aggressive adhesion, fast grab, improved water resistance, flexibility, and tack. Polyvinyl acetate based wood adhesives plasticized with POLYCO 438 possess increased shear strength. Data Sheet P-30.

POLYCO 446

Stable dispersion of vinyl chloride internally plasticized by copolymerization. On air drying yields clear, glossy, flexible, water and grease resistant films. Uses: Pigment binder for leather and textile coating, heat seal and adhesive base. Data Sheet P-32.

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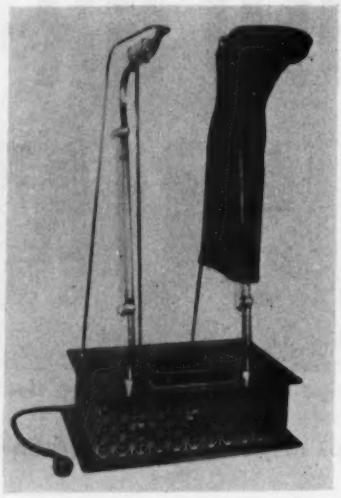
Sun-Kraft Boot and Shoe Sterilizers

A new application of the germicidal properties of ultra-violet rays is said to be displayed in the new boot and shoe sterilizers developed and manufactured by Sun-Kraft Health Products, Inc., 158 East Grand Ave., Chicago 11, Ill. The cold ultra-violet tubes used in both sterilizers radiate 87 percent of their total output at the 100 percent efficient bacteria killing range of 2537 A.U.



indefinitely. The average killing time of surface bacteria and fungi by the use of ultra-violet rays is 24 seconds. One of the outstanding features represented in both these models is that the Sun-Kraft cold ultra-violet tubes never burn out nor will they weaken in intensity of U.V. output, and are guaranteed for ten years (except breakage).

Job to Do?

SEE PAGE 426

ALCO OIL & CHEMICAL CORPORATION

First to Present as Prime Producers

AQUEOUS SUSPENSIONS OF ULTRA ACCELERATORS,
BY A NEW PROCESS, FOR LATEX COMPOUNDING

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VULCACURE ZM
50% Zinc Dimethyldithiocarbamate

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VULCACURE NB
47% Sodium Dibutyldithiocarbamate

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PARTICLE SIZE EQUIVALENT TO FORTY-EIGHT HOUR BALL MILLED DISPERSIONS

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TRENTON AVE. and WILLIAM ST., PHILADELPHIA 34, PA.

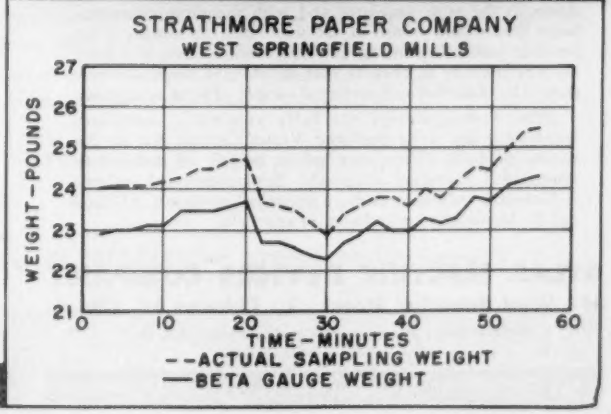
Write today for Technical Bulletin

STRATHMORE Likes Tracerlab BETA GAUGES Because...

. . . they have found that their Tracerlab BG-1 gauge enables them to hold sheet weight to less than a 3% variation. As their machine operators gain confidence in the instrument, Strathmore feels that they may be able to reduce this figure.

This outstanding New England firm is always striving to improve quality for their customers, and the gauge was purchased primarily for this purpose. In addition to maintaining greater weight uniformity, however, Strathmore has found that the gauge has effected savings in raw materials. Other mills operating Tracerlab gauges have found that raw material savings quickly repay the gauge's low cost.

Upper picture shows Strathmore Beta Gauge installation; lower chart graphically presents an unexplained machine aberration noted by the gauge and recorder and confirmed by subsequent sample weighings. Minor discrepancies between curves are due to the difficulty of getting samples in exactly corresponding places.



Tracerlab
130 HIGH ST., BOSTON, MASS.

How will YOUR product stand up in use?

An ATLAS FADE-OMETER will give you the answer

The time saved by quick and accurate determination of the light damage to products can speed up the marketing of new products by months or years. Fading, checking, cracking, warping and other factors of deterioration attributed to sunlight can be predetermined in the laboratory with the Fade-Ometer.

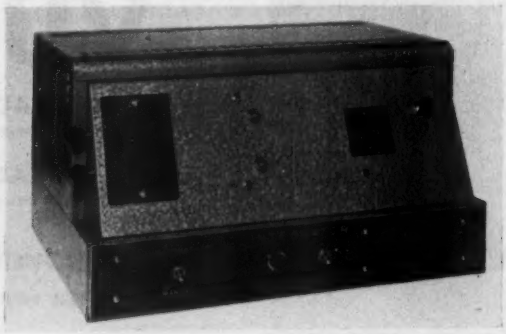
The Fade-Ometer gives every product a thorough going-over, subjecting it to the same sunlight conditions found in actual use — but doing it in a fraction of the time normally required. Using the best man-made reproduction of natural sunlight, and operating on a 24-hour a day basis, the Fade-Ometer soon causes the product to break down in the same sequence and with the same characteristics that would occur in service. Thus, by testing your product before beginning quantity manufacture, you have the opportunity to observe and correct any fault where it should be observed and corrected—*right in your own plant.*

Atlas Fade-Ometers are fully automatic machines employing the Atlas Enclosed Violet Carbon Arc as the source of light. They may safely be left in continuous unattended operation overnight. Replacement of carbons is necessary only once each 24 hours of operation. All tests can be identically reproduced at any time.

ATLAS ELECTRIC DEVICES COMPANY
361 West Superior Street • Chicago 10, Illinois
Manufacturers of accelerated testing devices for more than a quarter of a century
FADE-OMETERS • WEATHER-OMETERS • LAUNDER-OMETERS

Instron Electro-Mechanical Integrator

An automatic electro-mechanical unit, which is based on standard computor techniques and which is said to provide accurate time-integral of any d.c. input function, has been introduced by the Instron Engineering Corp., Quincy 71, Mass. Called the Integrator, the unit is said to have application in many fields, including the integration of stress-strain curves, analysis of graphical data, continuous process weighing, and totalizing illumination. The latter function is reported to be applicable for weathering or fading tests involving light on textiles, paints and other materials.



The unit combines the advantages of mechanical and electronic integrators to give outstanding features of high speed response, long time stability, and unlimited output in one instrument. A measure of the time integral of the input is registered on a mechanical revolution counter geared to the output. The output speed is made directly proportional to the integrand input signal through an accurately controlled variable speed drive with tachometer feedback. In addition, a high speed electronic integrator instantaneously integrates any transients or tachometer response errors and applies this correction factor. When used with a potentiometer recorder or other mechanical input the signal is derived from a multi-turn potentiometer which can be supplied from a stabilized voltage source incorporated in the unit.

The Integrator is available in one or two counter models. The two counter model (illustrated) incorporates electric clutches and can be operated either manually or automatically from some auxiliary switching function. This is useful in determinations where it is desirable to integrate separately the successive portions of a curve, such as the trace and retrace portion of a hysteresis cycle.

North American Philips Co., Inc., Mount Vernon, N. Y., has introduced a new **Norelco 90-Degree Geiger-Counter X-Ray Spectrometer** which is said to provide at minimum cost a powerful analysis tool for use in research as well as for production control. The new unit is designed to provide a full standard range of operation

---

W. C. Dillon & Co., Van Nuys, Calif., has added a new model to its line of **mechanical pressure gauges.** The new model is designed to measure the amount of tension in a moving or stationary cable, plastic filament, yarn, paper, etc. Readings are taken directly in pounds by means of a jewelled dial indicator.

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Stability of "Pick-up" — practically indestructible.
Zero Adjustment — easily made by adjustable resistor.
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OF HOSE REINFORCEMENT

offers you all these advantages...

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- 500% greater labor efficiency
- 90% less down time
- Lower maintenance
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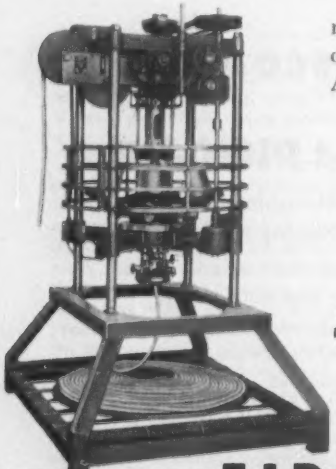
- 1/7 power required
- Minimum noise
- Lower capital investment

The Fidelity Knitter uses untreated rayon, cotton, nylon, fiberglass, etc. as purchased, eliminating costly treating and rewinding equipment. Only 4 yarns to tend, save time and give consistent hose diameters. No drying time after knitting.

Results—a finer, more flexible hose with better adhesion, at a lower cost than braided hose.

Only Fidelity Knitters can give you all these advantages . . . advantages that put you ahead of competition and provide your customers with a better hose.

Why not write for new bulletin on single or double deck models. ACT NOW!



MODEL D-25
FIDELITY VERTICAL HOSE REINFORCEMENT MACHINE

Manufacturers of intricate precision machinery since 1911.

FIDELITY MACHINE COMPANY INC.

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NRM 2½-Inch Rubber Extruder

A new NRM 2½-inch rubber extruder, designated the NRM heavy duty Model 50, has recently been put into production by the National Rubber Machinery Company, Akron 8, Ohio. Incorporating the very latest improvements in rubber extruder design, the

Model 50 extruder is a versatile production extruder designed for producing all standard rubber extrusions, including wire, cable, and hose covering. Having a nominal capacity of 200 to 250 lbs. per hour, it features a new self-contained, heavy duty cone worm gear reduction unit, and a new space saving fabricated steel base.

J. M. Nash Co., Milwaukee, Wisc., has announced production of a **ten spindle automatic flash lathe,** with intermittent motion on the turret. Originally designed for the plastic industry to handle various finishing operations on circular plastic moldings, the unit is said to be equally useful in the metal trades industry. The machine handles diameters up to 4½ inches and there is provision for height adjustment up to 8 inches. It is called the Nash No. 103-B Automatic Flash Lathe.

Development of a new **conveyor belt weighing system** capable of electronically adding, subtracting and recording the tons per hour of material delivered to one or more points was announced recently. The new belt system, developed jointly by the Trans-Weigh Co., Wayne, Penna., and the Minneapolis-Honeywell Regulator Co., Philadelphia, Penna., is applicable for belt-conveyed materials ranging from low-grade ore to refined sugar.

An all-purpose ultra-violet laboratory unit, which can be used for weathering research, built into a storage and carrying case, has been introduced by the Cooper Hewitt Electric Co., Hoboken, N. J. Called the **Cooper Hewitt Researcher,** ultra-violet energy is furnished by a 400-watt high pressure quartz mercury arc lamp with an envelope of clear fused quartz.

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100% NATURAL CRUDE RUBBER IN FLOWABLE FORM

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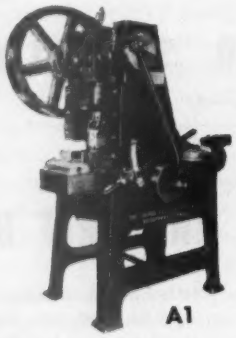
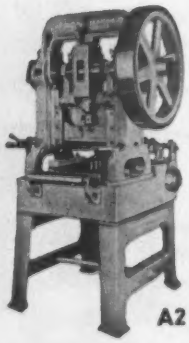
For MORE than Half a Century the name COULTER has meant MORE in higher quality cuttings . . . MORE IN GREATER PRODUCTION.

MODEL A-1
Cutting Heels at high speed production or short runs.

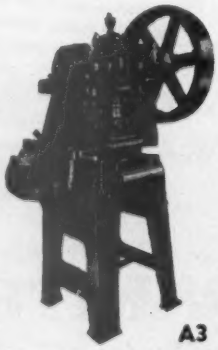

A1


A2

MODEL A-2
Cutting Multiple Heels, Half and Full Soles with stock grain.

MODEL A-3
Cutting Multiple Heels and Taps with or across stock grain.

MODEL A-2s
(Not illustrated)
Cutting across grain of stock.


A3

COULTER PRODUCTION MACHINES SINCE 1896

REVIEWS

BOOKS

Directory of the International Rubber Industry. Published by Verlag fur Wirtschaftsliteratur, G.m.b.H., P.O. Box 121, Zurich 55, Switzerland. Available from Swiss American Advertising Co., 1910 Marmion Ave., New York 60, N. Y. 6½ x 9 in. 416 pp. $12.00.

There has long been need for an international directory covering the rubber manufacturing industry, a need which goes a long way toward fulfillment by the publication of this work, the first attempt at world-wide coverage. Since it is a first attempt, and because of the enormity of the job, there are some definite improvements called for, and it is to be hoped these improvements will be made in any subsequent edition planned by the publishers.

The major portion of the directory is devoted to listings of rubber manufacturers in various countries, grouped by areas, including Europe, North America, South America, Central America, Africa, Asia, and Australia and New Zealand. A total of 70 separate countries is involved. The listings cover company name and address, type of goods produced and, where possible, the number of workers employed. No attempt is made to include data on company personnel, one of the main features of such national directories as the "Rubber Red Book" or the "Rubber Trade Directory of Great Britain."

In view of a language difficulty, the products shown for companies in various countries appear in either English, French or German, although in some cases they are indicated under separate listings in more than one language, the second one generally being English. Recognizing this problem, the publishers have included a glossary of rubber products and terms in the three languages used, these glossaries covering German-English-French, English-German-French, and French-German-English. Inclusion of the glossaries made it possible to avoid printing the detailed products of each firm in three languages, although presenting the details in this manner would have been of considerable help to users of the directory.

A rather odd system is used in the listing of companies for each country included. Instead of using a straight alphabetical system, the companies are arranged "in alphabetical order by localities." What this means is that the names of the cities in which the companies are located were used as an alphabetical guide. This makes it somewhat difficult to locate any specific company in any particular country, unless the user is aware of the exact city or town in which the company is situated. In the case of the United States, for example, listing of the companies by states would have been a preferable method. In all cases, a straight alphabetical listing by companies would seem to be the better method.

In addition to data on rubber manufacturers the directory includes a list of suppliers of rubber chemicals, compounding ingredients, machinery, etc., presumably on a world-wide basis. This section covers only some 20 pages and could stand considerable expansion. Other sections are devoted to lists of schools and research laboratories, professional organizations, and professional journals.

Despite these obvious shortcomings, this international rubber directory is a welcome addition to the industry's store of knowledge and should prove a valuable adjunct to international trade.

•

The Goodyear Story. Goodyear tire & Rubber Co., Akron, Ohio. 6 x 9 in. 24 pp.

This booklet presents a condensed yet comprehensive history of the company from its inception in 1898 to the present. It should serve as a ready reference regarding the growth of the company, the scope of its varied operations, and the guiding principles upon which the business was founded and has grown.

RANDALL & STICKNEY

THICKNESS GAUGES FOR RUBBER

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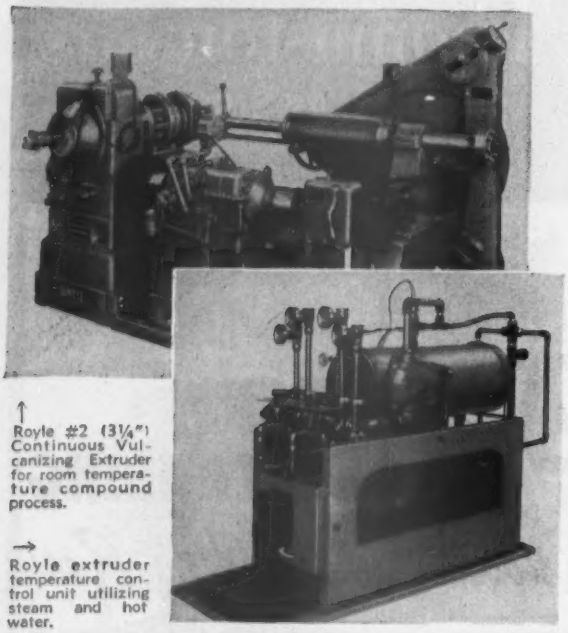
The room temperature compound process and associated equipment recently developed by the Western Electric Company, Incorporated, offer nine important advantages. These advantages begin with the storage of completely mixed, ready-to-extrude, rubber, GR-S, or Neoprene compounds and extend to a smoother and improved appearance for the finished product.

The complete extruder vulcanizing portion of the room temperature compound process is available to insulated wire producers* from John Royle and Sons who, for seventy-two years, have been building extruding machines to meet the most exacting process requirements.



↑ Royle #2 (3¼") Continuous Vulcanizing Extruder for room temperature compound process.

→ Royle extruder temperature control unit utilizing steam and hot water.

CHECK THESE ADVANTAGES:

- Improved diameter control
- Reduction in compound scrap
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- Permits storage of completely mixed compounds
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- Eliminates "warm-up" operation
- Possible mill-room economies
- "Hot" machines may be converted
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10 ESSEX STREET, PATERSON 3, NEW JERSEY

REVIEWS (CONT'D)

A.S.T.M. Standards on Textile Materials. Published by the American Society for Testing Materials, 1916 Race St., Philadelphia 3, Penna. 6 x 9 in. 660 pp. Heavy paper cover. $5.00.

This new compilation of textile standards includes in their latest form 99 specifications, test methods and tolerances developed by A.S.T.M. Committee D-13 on Textile Materials. In addition to the standards, extensive sections give photomicrographs of common textile fibers and photographs of defects in woven fabrics, a glossary of textile terms, and terms relating to hand of fabrics. Two technical papers are also included, one on "An Application of Statistics to Quality Control in the Textile Industry" and the other on "Statistical Considerations in Fiber Research." A convenient table of contents is provided (by subject and A.S.T.M. serial designations), as well as an extensive index.

•

Classified Directory of Wisconsin Manufacturers: 1952-53. Published by the Wisconsin Manufacturers Association, 633 North Water St., Milwaukee 2, Wisc. 6 x 9 in. 954 pp. $12.50.

This latest edition of the Wisconsin Directory, the 12th to be issued, represents a record not only in size but in comprehensive coverage of Wisconsin industry. More changes in data pertaining to individual companies have been made than in any other issue since publication was first begun in 1921. Like previous editions, it contains both alphabetical and geographical lists of Wisconsin manufacturers of all kinds, as well as a products index section. There is also an index of brands made in Wisconsin and a special list of Wisconsin canneries. All data has been revised and brought completely up to date.

•

The Development of Executive Talent. Edited by M. Joseph Dooher and Vivienne Marquis. Published by the American Management Association, 330 West 42nd St., New York 36, N. Y. 6 x 9 in. 576 pp. $6.75.

This comprehensive book is a complete and authoritative company guide to executive training and management development. It is a manual designed to meet the needs of any company contemplating the introduction of a program of executive development for the first time or desiring to improve its present program. The main body of the book is divided into nine parts, consisting of 50 chapters, including an appendix and a bibliography. Among subjects covered are basic principles and practices, organization planning, putting the program into action, program evaluation, and trends in management development. Case studies of numerous companies are included.

Job to Do?
SEE PAGE 426

Don't let **SCORCHED RUBBER** *spoil your day!*

Scorched rubber is a needless waste. Temperature can be controlled when known. Make the use of Cambridge Surface Pyrometers routine procedure in your plant. There are models that are ideal for checking temperature during calendering, mixing, extruding and molding. Each instrument is accurate, rugged and quick-acting, and takes the guesswork out of surface temperature determination.

Combination and single-purpose instruments.

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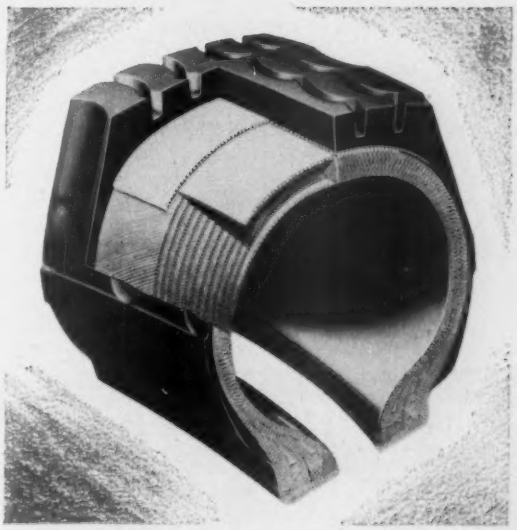
Resorcinol-formaldehyde resin is superior to other adhesives in bonding synthetic reinforcing fibers to rubber, synthetic and natural. Industrial belting, hose and tires are among the many rubber products made stronger, more permanent by Resorcinol-based resins.

In the production of heavy duty tires, especially, the use of Resorcinol is practically mandatory.

Rugged tires, such as those for trucks, airplanes, farm and earthmoving equipment, generally require nylon and rayon cord for their construction. Other available adhesives do not form satisfactory bonds between these smooth synthetic fiber filaments and the rubber.

Resorcinol-formaldehyde resin, however, creates a bond between synthetic cords and rubber that will withstand prolonged flexure in service without separating.

For further information about the interesting reactions, properties and other uses of Resorcinol, write to:



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Types, grades and blends
for every purpose, wherever
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can be used in production
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Akron, Boston, Trenton, Chicago, Denver, Los Angeles

Annual Report on the Progress of Rubber Technology: 1951. Edited by T. J. Drakeley. Published by the Institution of the Rubber Industry, 12 Whitehall, London, S.W.1, England. 7¼ x 9¾ in. 136 pp. $3.00.

This latest progress report, the fifteenth to be issued by the Institution of the Rubber Industry, covers developments in the year 1951. It is divided into 22 sections, each one contributed by an expert in the field and complete to extensive bibliographies. Some 20 pages larger than the previous edition, it covers the usual array of reports on various branches of the rubber industry from planting and production to the manufacture of finished goods. The sections on "Compounding Ingredients" and "Footwear," omitted from the previous edition, have been restored, but the section on "Works Processes and Materials" has been left out. The inclusion of author and subject indexes in these annual reports, the work of Dr. Drakeley, is of considerable value in the use of the reports.

•

Technical Data on Plastics: 4th Edition. Published by the Manufacturing Chemists' Association, Inc., 246 Woodward Building, Washington 5, D.C. 8½ x 11 in. 184 pp. $2.50.

The latest edition of this valuable manual covers 24 types of plastics materials, three more than the previous edition. It also contains two new sections which show properties of various plastics when made in the form of foams or thin films. The materials for which data are published for the first time are alkyd and silicone molding compounds and epoxy resins. The other materials included run the full gamut of the plastics industry from urea-formaldehyde molding materials to nylon. Data is, of course, given on vinyl chloride polymers and copolymers. As in previous editions, the manual furnishes descriptive information on the general characteristics of each of the materials covered, along with graphical and tabular data on fabrication, durability, and electrical, mechanical and miscellaneous properties.

•

Money in Exports. (Vol. 2). Edited and published by Walter Buchler, 101 Leeside Crescent, London, N.W. 11, England. 5 x 7 in. 234 pp. $3.00.

Pertinent data on the economic situations which exist in many lands, much of it based on personal observations made by the author, is given in this handy little book. Written in an easy-to-follow style, devoid of the usual tabular material on exports and imports, information is furnished on various countries in Europe, the Middle East, Africa, Central America, South America, and some of the less frequently covered areas, such as the Cook Islands in the Pacific.

Job to Do?
SEE PAGE 426

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BOOKLETS, CATALOGS, etc.

Lustrex Latices: Polymerized Styrene Resin Dispersions. (Production Information Bulletin No. 58). Plastics Division, Monsanto Chemical Co., Springfield, Mass. 8½ x 11 in. 16 pp.

Up-to-date technical information on Lustrex latices, the company's aqueous dispersions of styrene resins, is presented in this bulletin. New compounding data on the latex series is presented as are discussions of plasticizing and pigmenting methods. Also featured in the booklet are tables and curves on the physical properties of the latex films. Eleven diverse uses for the Lustrex latices are suggested.

•

Central Hydraulic Systems for the Rubber and Plastics Industries. (Bulletin 900). Greer Hydraulics, Inc., 454 Eighteenth St., Brooklyn 15, N. Y. 8½ x 11 in. 8 pp.

This new bulletin describes and illustrates compression molding press systems and compares weight-loaded and hydropneumatic accumulator systems. Various schematic diagrams illustrate hookups for different conditions, and show how Greer Accumulators reduce pump and motor sizes, power cost, and installation expense. The bulletin also shows how to find the required accumulator capacity for a typical press plant, and gives the complete method of calculation.

•

Synthetic Methanol. Industrial Chemicals Department, Commercial Solvents Corp., 260 Madison Avenue, New York 16, N. Y. 8½ x 11 in. 30 pp.

This booklet was prepared to assist both old and new users of methanol, and contains brief descriptions of some of its uses, the specifications under which it is sold, and methods of test. Also offered is a short discussion of toxicology and safety measures. An extensive collection of data on physical properties is also presented for the reader's convenience.

•

Caustic Soda. Wyandotte Chemicals Corp., Wyandotte, Mich., 8½ x 11 in. 56 pp.

This interesting booklet contains data on the different grades of caustic soda and the manufacturing processes involved. Other information presented includes discussions on analytical methods, shipping, handling, containers and storage. Bound in handy loose-leaf style, the booklet is profusely illustrated with photographs, drawings, charts and graphs.

•

Plasticizer DP-250. E. F. Drew & Co., Inc., 15 East 26th St., New York 10, N. Y. 8½ x 11 in. 4 pp.

The characteristics, general properties, solubilities and applications, as well as records of performance of "Plasticizer DP-250" in three representative types of resins, are included in this folder. While the folder covers briefly the basic properties of the product, it is also intended as a guide in determining possible uses in vinyl compositions.

•

Heliogen Colors. General Dyestuff Corp., 435 Hudson St., New York 14, N. Y. 8½ x 11 in. 16 pp.

The properties and uses of "Heliogen" colors are described in this booklet. It gives full information on the powder brands, paste and presscake brands, water-dispersible powder brands, and water-dispersible paste brands of Heliogen colors. The Heliogens are described as finding use in rubber, textiles, plastics, printing inks, paints and lacquers, and other materials.

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MARKETS

Rubber – Crude, Reclaimed and Scrap – Cotton – Ducks – Tire Fabrics – Sheetings

NEW YORK, JAN. 7, 1953

Natural Rubber

The price of spot rubber on the New York Commodity Exchange has swung in a range of 3.25c since our last report (December 5), high for the period being 33.00c reached on December 9 and again on December 10, and low being 29.75c reached on December 17 and 18. The average price of spot rubber for the month of December was 31.26c based on 22 trading days. This compares with an average of 29.14c in November.

According to advices reaching this country, output of natural rubber in Brazil totaled 24,948 long tons in the first nine months of 1952, a 25% increase over the 19,843 tons produced in the like period of 1951. Imports of natural rubber into Brazil in the first nine months of 1952 amounted to 9,443 tons.

A new listing on rotation rubber available to trade and industry in the United States amounting to some 16,500 tons was disclosed early in January. While not a large amount, the tonnage does represent about one-third of consumers' requirements for a month.

Today's quotations on the outside market, London and Singapore, follow:

Outside Market

No. 1 Ribbed Smoked Sheets:	
Spot	.30¼
January	.30¼
February	.29⅞
Thin Latex Crepe:	
Spot	.38
Thin Brown Crepe, No. 2	.28
Smoked Blankets	.27¼
Flat Bark Crepe	.25¼

London Market
(Standard Smoked Sheets)

March	29.46 - 30.04
April-June	29.46 - 29.75

Singapore Market
(Standard Smoked Sheets)

February	29.06 - 29.17

Closing Rubber Prices on New York Commodity Exchange (No. 1 R.S.S. Contract)

FROM DECEMBER 6 TO JANUARY 7

Dec.	Spot	Mar.	May	July	Sept.	Sales
6	——	——	——	——	——	——
7	——	——	——	——	——	——
8	31.75	31.10	30.15	29.60	29.15	87
9	33.00	32.60	31.75	31.00	30.55	84
10	33.00	32.15	31.25	30.60	30.20	65
11	32.50	31.75	30.90	30.10	29.60	63
12	31.75	31.05	30.05	29.20	28.80	16
13	——	——	——	——	——	——
14	——	——	——	——	——	——
15	30.75	29.90	28.90	28.10	27.70	59
16	30.00	29.40	28.50	27.80	27.30	59
17	29.75	29.30	28.40	27.60	27.05	45
18	29.75	29.15	28.20	27.60	27.15	85
19	30.50	30.30	29.10	28.60	28.15	34
20	——	——	——	——	——	——
21	——	——	——	——	——	——
22	31.00	30.30	29.45	28.60	28.15	13
23	31.00	30.50	29.40	28.65	28.25	41
24	31.25	30.75	29.60	28.90	28.50	6
25	——	——	——	——	——	——
26	32.00	31.40	29.80	29.30	28.90	14
27	——	——	——	——	——	——
28	——	——	——	——	——	——
29	31.62	31.00	29.85	29.35	28.95	8
30	31.88	31.40	29.85	29.25	28.85	7
31	31.88	31.25	30.25	29.45	28.95	5
Jan.						
1	——	——	——	——	——	——
2	——	——	——	——	——	——
3	27.62	26.70	26.00	25.45	25.15	2
4	——	——	——	——	——	——
5	27.75	26.75	26.00	25.45	25.15	35
6	27.75	26.60	25.85	25.30	25.00	11
7	28.00	26.80	26.15	25.65	25.30	68

Scrap Rubber

Trade sources report that scrap tires remain plentiful at relatively low prices. Tubes, specialties and light-colored stocks of all kinds have been advancing in price. There has been talk of eliminating price ceilings on scrap, but with prices now substantially under ceilings on all grades, such removal would have little or no effect on the present price structure. Prices established by the Office of Price Stabilization are shown below:

(Prices Delivered Akron)

Mixed tires	ton	$26.00
Mixed beadless tires	ton	34.00
Light colored carcass	ton	130.00
Black carcass	ton	50.00
No. 1 peelings	ton	65.00
No. 2 peelings	ton	42.00
No. 3 peelings	ton	38.00
Buffings	ton	30.00
Truck and Bus S.A.G.	ton	28.00
Passenger S.A.G.	ton	28.00
Mixed S.A.G.	ton	26.00
Light colored tubes	lb.	.16
Natural rubber red tubes	lb.	.16
Natural rubber black tubes	lb.	.11½
Mixed natural rubber tubes	lb.	.10
Butyl rubber tubes	lb.	.057
GR-S rubber tubes	lb.	02
Mixed synthetic tubes	lb.	.03

Reclaimed Rubber

Sales of reclaim were down somewhat in December, caused chiefly by the short holiday month. Orders for January shipments are up, according to the trade. Apparently, manufacturers were holding down on year-end inventories. Red tube reclaim is now reported to be selling at the ceiling price of 24½c per pound in carload lots. Red and grey reclaims have also been advanced in price. OPS-established prices for reclaimed rubber follow:

(Prices for All Areas Except Calif.)

Premium Grade Whole Tire	.10½
First Line Whole Tire	.10
Second Line Whole Tire	.09½
Third Line Whole Tire	.09¼
Fourth Line Whole Tire	.08¾
Black Carcass	.14½
No. 1 Light Colored Carcass	.20¾
No. 1 Select Peel	.11¾
No. 1 Peel	.10½
Butyl Tube Reclaim	.14½
S.P. Natural Rubber Black Tube	.21
Natural Rubber Black Tube	.20
Natural Rubber Red Tube	.24¼
Natural Rubber Gray Tube	.24¼

Cotton Tire Fabrics

Prices for cotton tire fabrics and chafers have been considerably lowered in reflection of general market inactivity. What activity has been reported has centered about chafers. The market for cotton tire cord, however, remains at the low levels evidenced during the past months. Trade sources indicate that while a moderate market may hold for chafers in the next few months, not too much can be expected for tire cord. Current prcies follow:

Standard, Peeler, 12/4/2	lb.	.83
Extra Staple, Peeler, 12/4/2	lb.	.89

Chafers

14.4 oz. (per square yard)	lb.	.74
9.25 oz. (per sq. yard)	lb.	.69½
11.65 oz. (per sq. yard)	lb.	.66
8.9 oz. (per sq. yard)	lb.	.71

Cotton

Since our last report (December 5), the price of middling uplands on the New York Cotton Exchange has moved in the rather narrow range of 1.20c, high for the period being 34.30c reached on December 8, and low being 33.10c reached on December 18 and again on January 6. The average price of middling uplands for the month of December was 33.76c based on 22 trading days. This compares with an average of 35.59c in the previous month.

The New York Cotton Exchange has estimated the 1952 world crop of commercial cotton at 33,222,000 bales compared with 32,914,000 in 1951. This is the second largest crop on record, exceeded only by the 1937 crop of 36,745,000 bales. It is estimated that in 1952, 5,358,000 bales were produced in Communist bloc nations and 27,864,000 in the free world.

The U. S. Department of Agriculture has indicated that exports of American cotton during the 1952 marketing year may decline by more than 25% largely because of sharper competition in world markets. Exports last season totaled 5,500,000 bales. The department said that foreign sales in the 1952 marketing season may drop to 4,000,000 bales.

Trade sources report that French raw cotton importers have so far used only about $15,000,000 of a $50,000,000 credit negotiated with the Export-Import bank. This is due to several factors, one being fear of devaluation of the franc; secondly, Syrian, Mexican, Turkish and Pakistani cotton are cheaper than American cotton, and thirdly, home and export demand for French manufactured goods is still weak.

Quotations for middling uplands on the Exchange follow:

	Dec. 5	January 7		
	Close	High	Low	Close
Mar.	34.70	33.40	33.16	33.35
May	35.12	33.93	33.68	33.89
July	35.44	34.33	34.07	34.29

Synthetic Rubber

(Dry Types—Per Pound)

Butaprene NF	.490 - .500
Butaprene NL	.500 - .510
Butaprene NAA	.540 - .550
Butaprene NXM	.580 - .590
Chemigum 30N4NS	.500 - .510
Chemigum 50N4NS	.500 - .510
Chemigum N3	.580 - .590
G-E Silicone Rubber (compounded)	3.15 -4.00
G-E Silicone Gum (not compounded)	—— -4.48
GR-I	—— - .2075
GR-S	—— - .230
Hycar OR-15	.580 - .590
Hycar OR-25	.500 - .510
Hycar OS-10	.550 - .560
Neoprene Types CG and AC	—— - .500
Neoprene Type E	—— - .650
Neoprene Types FR and KNR	—— - .800
Neoprene Type GN	—— - .380
Neoprene Type GN-A	—— - .380
Neoprene Type RT	—— - .400
Neoprene Type S	—— - .380
Neoprene Type W	—— - .400
Paracril B	.500 - .510
Paracril BJ	.500 - .510
Paracril C	.580 - .590
Silastic (compounded)	2.35 -4.40
Thiokol Type A	—— - .470
Thiokol Type FA	—— - .640
Thiokol PR-1	—— - .950
Thiokol Type ST	—— -1.000

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STATISTICS *Of Interest to the Rubber Industry*

U. S. Imports and Re-Exports of Natural Rubber

	GROSS IMPORTS												
	Natural Rubber (Dry)			Natural Rubber (Latex)			Guayule				RE-EXPORTS		TOTAL NET IMPORTS
Year	Long Tons	Total Declared Value	Average Declared Value per pound Cents	Long Tons	Total Declared Value	Average Declared Value per pound Cents	Long Tons	Total Declared Value	Average Declared Value per pound Cents	Total Gross Imports Long Tons	Long Tons	Total Declared Value	Long Tons
1936	467,064	152,072,496	14.54	19,852	6,659,899	14.98	1,229	286,552	10.41	488,145	12,581	4,488,223	475,564
1937	574,600	237,307,041	18.44	23,185	10,213,670	19.67	2,691	745,873	12.37	600,476	7,948	3,386,408	592,528
1938	397,640	125,373,864	14.08	11,944	4,168,127	15.58	2,508	628,886	11.19	412,092	5,652	1,799,124	406,440
1939	469,946	167,586,780	15.92	27,437*	10,467,552	17.03	2,233	463,345	9.27	499,616	13,125	5,832,618	486,491
1940	781,202	303,308,823	17.33	33,789	14,593,466	19.28	3,633*	758,007	9.31	818,624	7,060	3,197,136	811,564
1941	989,498	401,976,317	18.14	34,797*	15,965,627	20.48	4,881	1,145,767	10.48	1,029,176	5,376	2,757,872	1,023,800
1942	266,276	112,537,426	18.87	10,646	5,630,667	23.61	5,523	1,660,792	13.42	282,445	10,856	5,913,386	271,589
1943	50,358	31,369,198	27.81	1,890	1,312,202	31.00	7,678*	3,636,789	21.14	59,926	22,583	16,446,707	37,343
1944	103,847	73,908,549	31.77	3,091	2,092,211	30.22	6,701*	3,351,233	22.33	113,639	9,739	8,712,695	103,900
1945	134,408	95,814,102	31.82	4,773	3,115,853	29.14	10,040	5,963,797	26.52	149,221	9,509	7,201,746	139,712
1946	376,502	228,796,110	27.13	8,421	5,843,085	30.98	5,344	2,859,246	23.89	390,267	7,711	5,331,954	382,556
1947	691,087	306,951,814	19.83	17,542	9,787,722	24.91	2,884	1,492,825	23.11	711,513	4,121	2,354,494	707,392
1948	702,293	290,849,177	18.49	32,745	18,288,223	24.93	302	71,330	10.53	735,340	6,672	3,259,324	728,668
1949	630,808	225,343,624	15.95	29,743	14,968,650	22.47	....	.....	....	660,551	6,253	2,746,109	654,298
1950	747,109	416,222,598	24.87	54,401	41,764,486	34.27	739	254,331	15.37	802,249	8,640	6,832,821	793,609
1951	677,874	727,343,348	47.90	54,963	80,178,309	65.12	1,619	1,258,941	34.71	734,456	2,603	3,947,740	731,853
1951:													
Aug.	66,217	70,536,735	47.55	4,529	5,805,789	57.23	148	93,807	28.31	70,894	159	290,479	70,735
Sept.	59,309	57,619,906	43.44	1,800	1,838,512	45.59	121	78,427	29.00	61,230	89	45,061	61,141
Oct.	51,850	49,109,610	42.28	3,055	3,499,763	51.15	206	149,590	32.42	55,111	73	120,779	55,038
Nov.	54,561	51,161,914	41.79	2,620	3,251,833	55.42	107	75,370	32.19	57,278	67	96,521	57,211
Dec.	44,332	42,695,894	42.99	860	1,190,609	61.82	171	110,448	28.79	45,363	25	22,732	45,338
1952:													
Jan.	80,561	76,995,564	42.67	2,569	3,299,142	39.95	153	97,922	28.60	83,283	140	207,976	83,143
Feb.	73,781	70,775,631	42.82	2,556	3,016,023	52.66	45	29,061	28.58	76,382	95	120,410	76,287
Mar.	81,577	76,567,896	41.90	3,570	4,149,537	51.88	25	12,701	22.68	85,172	93	127,007	85,079
Apr.	78,098	71,497,007	40.87	4,821	4,402,416	40.77	55	27,927	22.67	82,974	85	103,819	82,889
May	55,764	45,898,163	36.74	3,409	3,140,619	41.12	15	7,644	22.62	59,188	130	150,568	59,058
June	62,744	48,168,471	34.27	4,445	3,934,931	30.62	74	28,985	16.85	67,263	1,555	190,975	65,708
July	45,718	30,026,066	29.32	2,295	2,378,572	33.74	412	153,855	16.66	48,425	135	128,437	48,290
Aug.	62,455	37,485,360	26.79	4,684	3,513,319	33.49	....	.....	....	67,139	373	278,927	66,766
Sept.	47,696	28,223,624	26.42	3,813	2,771,909	32.45	....	.....	....	51,509	279	202,978	51,230

Source: Bureau of the Census, U. S. Department of Commerce. * Adjusted to agree with total gross imports.

Notes: (1) Figures for latex are on a dry weight basis. (2) Figures for re-exports include natural rubber (dry and latex) and guayule. (3) In the years 1940 through 1943, crepe sole rubber imports were reported under a separate classification. Such imports, which are included under natural rubber, dry above, were: 856,294 pounds, valued at $191,097 in 1940; 379,607 pounds, valued at $85,924 in 1941; 662,503 pounds, valued at $159,530 in 1942; and 21,653 pounds, valued at $5,215 in 1943.

Natural Rubber
(Including Latex and Guayule)

(All Quantities in Long Tons)

Year	New Supply	Consumption	Re-Exports	Stocks On Hand at End of Period
1936	488,145	575,000	12,581	223,000
1937	600,479	543,600	7,902	262,204
1938	411,983	437,031	5,652	231,500
1939	499,473	592,000	13,125	125,800
1940	818,243	648,500	7,060	288,864
1941	1,029,007	775,000	5,376	533,344
1942	282,653	376,791	10,856	422,714
1943	55,329	317,634	20,815	139,594
1944	107,834	144,113	9,665	93,650
1945	135,672	105,429	6,743	118,715
1946	400,687	277,597	4,338	237,467
1947	688,354	562,661	4,101	129,038
1948	735,227	627,332	6,673	141,541
1949	660,792	574,522	6,253	106,619
1950	802,249	720,268	8,644	89,215
1951	733,048	454,015	2,603	76,569
1951:				
Aug.	77,338	36,506	158	67,491
Sept.	61,409	36,887	27	56,941
Oct.	55,219	37,407	73	63,501
Nov.	57,108	35,037	67	63,689
Dec.	45,193	33,256	25	76,569
1952:				
Jan.	83,283	36,989	140	75,488
Feb.	76,383	34,841	95	73,959
Mar.	85,172	35,682	93	61,553
Apr.	82,974	36,417	85	59,422
May	59,188	36,437	130	63,988
June	67,246	36,946	156	72,995
July	49,251	32,760	136	84,839
Aug.	67,139	32,941	373	86,657
Sept.	52,785	45,110	279	84,150
Oct.	55,651	41,348	337	82,861

Source: Rubber Division, NPA, U. S. Department of Commerce.

U.S. Gross Imports of Balata, Jelutong, Gutta-Percha, etc.

(All Quantities in Long Tons)

	Balata		Jelutong		Gutta-Percha & Other Guttas	
Year	Tons	Value	Tons	Value	Tons	Value
1936	535	199,368	6,163	1,296,364	1,568	555,643
1937	354	151,344	7,109	2,017,786	1,122	440,894
1938	509	181,140	9,132	2,944,504	444	204,582
1939	694	265,553	6,640	1,603,418	1,740	539,255
1940	648	300,500	7,451	2,449,137	2,340	1,004,885
1941	924	489,514	8,821	2,954,001	1,783	607,025
1942	1,544	1,107,059	1,200	530,296	804	525,763
1943	1,047	708,701	35	14,840	....	.....
1944	1,012	660,805	88	45,578	10	4,999
1945	1,361	907,253	....	.....	36	21,970
1946	2,281	2,233,065	304	256,169	423	458,064
1947	1,982	2,276,531	2,878	1,496,887	392	779,591
1948	1,195	805,078	3,401	2,377,765	423	542,788
1949	1,391	814,554	1,043	834,978	197	189,021
1950	2,117	1,589,885	1,789	1,515,162	541	745,418
1951	2,452	1,973,271	1,669	2,608,359	383	430,539
1951:						
July	115	94,073	193	308,222	23	32,106
Aug.	121	136,723	142	224,194	8	7,060
Sept.	307	227,392	62	105,395	12	14,660
Oct.	368	383,056	138	241,246	3	6,175
Nov.	148	123,442	167	270,242	33	26,011
Dec.	96	113,773	52	99,761	8	23,467
1952:						
Jan.	126	95,203	204	375,802	27	59,439
Feb.	31	23,118	15	211,229	10	33,474
Mar.	50	43,207	128	217,096	27	43,861
Apr.	49	31,239	234	409,076	32	41,391
May	57	32,488	92	141,257	26	27,853
June	57	31,787	212	273,357	50	50,941
July	55	35,941	100	148,350	16	18,422
Aug.	16	9,037	142	193,364	28	31,011
Sept.	109	51,414	148	183,692	15	12,291

Source: U. S. Department of Commerce.

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Synthetic Rubber—Totals

(GR-S, Neoprene, Butyl, and Buna N Types)

(All Quantities in Long Tons)

Year	Production	Imports	Consumption	Exports	Stocks On Hand at End of Period
1941	8,383	.....	6,259	572	1,702
1942	22,434	.....	17,651	1,419	4,612
1943	231,722	.....	170,891	18,148	41,568
1944	762,630	11,043	566,670	104,266	142,927
1945	820,373	10,407	693,580	83,778	203,454
1946	740,026	7,709	761,699	72,920	114,963
1947	508,702	1,093	559,566	11,385	62,366
1948	488,343	15,671	442,072	4,874	115,111
1949	393,690	17,242	414,381	6,483	98,042
1950	476,184	25,722	538,289	7,652	52,758
1951	845,155	10,085	758,897	9,249	129,420
1952:					
June	64,040	2,293	66,203	1,154	151,324
July	58,992	1,456	58,642	1,499	152,373
Aug.	59,214	1,612	61,214	1,921	150,254
Sept.	58,352	2,108	66,668	1,573	141,837
Oct.	62,553	2,101	73,534	....	132,998

Source: U. S. Department of Commerce.

Notes: (1) These figures are revised from time to time and the latest available issue should be consulted for the most accurate data. (2) Figures shown include the output of both government and privately-owned plants. (3) Figures for 1941 are estimated.

Synthetic Rubber—By Type

(All Quantities in Long Tons)

New Supply

	GR-S (Buna S)	GR-M (Neoprene)	GR-I (Butyl)	Buna N Types	Total
1944	679,949	56,660	20,252	16,812	773,673
1945	724,859	45,672	52,378	7,871	830,780
1946	613,408	47,766	80,823	5,738	747,735
1947	408,858	31,495	62,824	6,618	509,795
1948	405,492	34,848	56,662	7,012	504,014
1949	310,599	35,215	54,046	11,072	410,932
1950	378,887	50,067	60,915	12,037	501,906
1951	704,525	58,907	76,475	15,333	855,240

Consumption

1944	495,552	46,243	10,763	14,112	566,670
1945	600,145	42,394	43,012	8,029	693,580
1946	632,126	44,357	79,228	5,988	761,699
1947	448,589	37,703	68,838	4,536	559,666
1948	345,313	32,118	58,870	5,771	442,072
1949	299,420	31,753	50,855	8,827	414,381
1950	416,230	43,781	66,348	11,930	538,289
1951	626,444	48,887	70,500	13,066	758,897

Exports

1944	98,380	4,799	530	557	104,266
1945	76,555	5,837	980	406	83,778
1946	68,763	2,642	495	797	72,697
1947	7,951	2,617	62	755	11,385
1948	1,093	2,875	21	885	4,874
1949	1,401	3,330	178	1,574	6,483
1950	900	4,826	31	1,895	7,652
1951	483	6,825	216	1,725	9,249

Stocks at End of Period

1944	116,130	11,739	9,892	5,166	142,927
1945	170,571	9,703	18,378	4,802	203,454
1946	81,483	10,470	19,478	3,755	115,186
1947	40,606	5,237	13,184	3,339	62,366
1948	96,282	5,072	10,995	2,762	115,111
1949	77,731	4,654	12,224	3,433	98,042
1950	36,942	5,733	7,243	2,840	52,758
1951	105,271	8,379	12,481	3,289	129,420

Source: U. S. Department of Commerce.

Notes: (1) These figures are revised from time to time and the latest available issue should be consulted for the most accurate data. (2) Figures for GR-M and Buna N Types include production of privately-owned plants.

Gasoline Consumption

(In Thousands of Barrels of 42 Gallons)

	1945	1946	1947	1948	1949	1950	1951	1952
Jan.	52,008	51,746	57,057	61,308	63,125	66,981	80,554	86,863
Feb.	48,856	47,654	50,551	56,487	57,980	63,274	72,717	82,043
Mar.	55,364	56,703	59,947	68,171	73,282	78,780	86,486	87,065
Apr.	59,024	62,111	64,140	72,183	75,318	80,350	87,430	98,653
May	60,748	66,800	70,865	77,186	81,665	89,035	100,188	101,137
June	60,580	63,247	71,329	78,044	83,374	90,174	96,093	99,305
July	66,170	60,076	73,441	81,428	82,129	91,677	100,476	105,307
Aug.	70,058	66,729	72,089	80,351	84,707	94,507	101,206	102,954
Sept.	64,529	62,268	71,384	76,159	80,832	86,725	91,803	100,095
Oct.	55,708	66,637	73,277	75,164	79,327	89,067	99,945	103,689
Nov.	53,543	61,345	64,158	72,560	76,346	82,688	88,702	.....
Dec.	49,745	61,101	67,506	72,162	75,628	81,032	84,394	.....
Total	696,333	735,417	795,015	871,270	913,713	994,290	1,090,354	.....

Source: U. S. Bureau of Mines.

Reclaimed Rubber

(Including Natural and Synthetic)

(All Quantities in Long Tons)

Year	Production	Consumption—Tons	Consumption—% to Crude [a]	Exports	Stocks On Hand at End of Period
1936	150,571	141,486	24.6	7,085	19,000
1937	185,033	162,000	29.8	13,233	28,800
1938	122,400	120,800	27.6	7,403	23,000
1939	186,000	170,000	28.7	12,611	25,250
1940	208,971	190,244	29.3	11,347	32,636
1941	274,202	251,231	32.2	13,851	41,750
1942	286,007 [b]	254,820	64.6	30,405	42,532
1943	304,058 [c]	291,082	59.6	15,678	46,201
1944	260,631 [d]	251,083	35.3	11,800	43,832
1945	243,309	241,036	30.2	13,413	28,155
1946	295,612	275,410	26.5	14,461	33,666
1947	291,395	288,395	24.8	14,556	35,943
1948	266,861	261,113	24.4	11,428	32,630
1949	224,029	226,679	22.5	10,637	28,263
1950	314,008	303,733	24.1	11,740	35,708
1951	366,700	346,121	28.5	14,722	45,082
1952:					
Apr.	24,034	23,911	23.0	1,070	39,767
May	23,267	22,314	21.7	1,078	40,169
June	21,179	21,850	21.2	903	38,973
July	16,338	18,354	20.1	735	36,287
Aug.	17,191	20,548	21.8	813	32,224
Sept.	22,009	23,131	21.8	860	31,430
Oct.	27,612	26,830	22.5	806	31,463
Nov.	22,906	22,587	21.0	833	29,486

Source: U. S. Department of Commerce.

Notes: (1) These figures are revised from time to time and the latest available issue should be consulted for the most accurate data. [a] Includes natural and synthetic rubber. [b] Includes 893 tons of imports. [c] Includes 67 tons of imports. [d] Includes 21 tons of imports.

Automobile Production in U. S.

(Civilian Production Only)

Year	Passenger Cars	Trucks	Total	Year	Passenger Cars	Trucks	Total
1932	1,135,491	235,187	1,370,678	1942	220,814	133,083	353,897
1933	1,573,512	346,545	1,920,057	1943	0	4,501	4,501
1934	2,177,919	575,192	2,753,111	1944	0	124,819	124,819
1935	3,252,244	694,690	3,946,934	1945	83,792	313,643	397,435
1936	3,669,528	781,862	4,451,390	1946	2,148,699	930,760	3,079,459
1937	3,915,889	892,382	4,808,271	1947	3,558,178	1,220,634	4,778,812
1938	2,000,985	485,852	2,486,837	1948	3,909,270	1,363,856	5,273,126
1939	2,866,796	704,308	3,571,104	1949	5,108,841	1,123,736	6,232,577
1940	3,692,328	721,637	4,413,965	1950	6,665,836	1,332,263	7,998,099
1941	3,744,500	875,381	4,619,681	1951	5,337,729	1,420,432	6,758,161
1951:							
Jan.	478,589	127,583	606,172	July	381,407	110,244	481,651
Feb.	505,865	111,935	617,800	Aug.	426,932	121,993	548,925
Mar.	617,399	136,794	754,193	Sept.	365,906	109,353	475,259
Apr.	503,038	135,415	638,453	Oct.	414,533	110,740	525,273
May	511,938	140,047	651,985	Nov.	356,788	93,179	449,967
June	482,029	134,818	616,847	Dec.	293,305	17,481	310,786
1952:							
Jan.	273,639	100,993	374,632	July	168,327	43,231	211,558
Feb.	334,058	100,533	434,591	Aug.	218,577	52,056	270,633
Mar.	373,237	109,167	482,404	Sept.	438,397	112,375	550,772
Apr.	416,155	112,833	528,988	Oct.	471,808	132,064	603,872
May	398,286	105,208	503,494	Nov.	405,111	114,106	519,217
June	408,700	109,526	518,226	Dec.	.....	.....	.....

Source: Automobile Manufacturers Association.

Note: Figures are based on factory sales. Revisions are made from time to time in these figures and the latest issue should be consulted for accuracy.

Rim Production

	1947	1948	1949	1950	1951
Passenger Car	21,346,004	23,842,796	27,715,344	35,096,404	29,146,048
Truck & Bus	7,737,353	6,920,231	4,238,174	6,625,129	6,877,419
Agricultural	2,633,699	3,140,882	2,695,430	2,853,483	3,019,581
Earth Mover	10,610	13,330	9,895	15,602	28,026
Total	31,727,666	33,917,239	34,658,843	44,590,618	39,071,074

	1952					
	June	July	Aug.	Sept.	Oct.	Nov.
Passenger Car	1,928,280	708,328	1,589,252	2,964,901	2,537,018	2,352,973
Truck & Bus	386,759	58,955	395,190	514,833	558,605	446,943
Agricultural	165,345	43,821	147,512	182,075	157,931	109,250
Earth Mover	1,753	494	712	538	2,396	3,594
Total	2,482,137	812,598	2,132,666	3,662,347	3,255,950	2,913,060

Source: The Tire & Rim Association, Inc.

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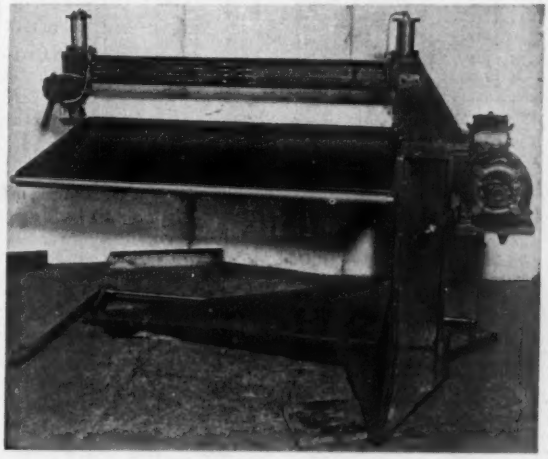

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Automotive Pneumatic Casings

(Thousands of Units)

	Shipments: Original Equipment	Shipments: Replacement	Shipments: Export	Shipments: Total	Production	Inventory End of Period
1939 (total)	18,208	38,022	1,279	57,509	57,613	8,665
Passenger Car.	15,742	33,471	607	49,820	49,933	7,108
Truck and Bus	2,466	4,551	672	7,689	7,680	1,557
1940 (total)	22,252	35,346	1,176	58,774	59,186	9,127
Passenger Car.	19,560	30,903	411	50,874	50,965	7,270
Truck and Bus	2,692	4,443	765	7,900	8,221	1,857
1941 (total)	24,780	39,895	1,489	66,164	61,540	4,436
Passenger Car.	19,855	34,119	586	54,560	50,392	3,165
Truck and Bus	4,925	5,776	903	11,604	11,148	1,271
1942 (total)	6,680	8,872	207	15,759	15,351	6,247
Passenger Car.	910	2,734	38	3,682	2,790	4,432
Truck and Bus	5,770	6,138	169	12,077	12,561	1,815
1943 (total)	6,128	18,547	225	24,900	20,423	1,883
Passenger Car.	82	10,606	71	10,759	7,620	1,132
Truck and Bus	6,046	7,941	154	14,141	12,803	751
1944 (total)	6,654	26,439	263	33,356	33,446	2,013
Passenger Car.	208	18,330	130	18,668	18,819	1,218
Truck and Bus	6,446	8,109	133	14,688	14,627	795
1945 (total)	5,984	36,479	504	42,967	44,524	3,077
Passenger Car.	1,115	25,463	222	26,800	28,200	2,214
Truck and Bus	4,869	11,016	282	16,167	16,324	863
1946 (total)	15,310	65,490	1,512	82,312	82,298	2,448
Passenger Car.	11,086	54,684	653	66,423	66,466	1,763
Truck and Bus	4,224	10,806	859	15,889	15,832	685
1947 (total)	25,056	62,871	3,256	91,183	95,550	6,949
Passenger Car.	19,644	52,857	1,608	74,109	77,795	5,444
Truck and Bus	5,412	10,014	1,648	17,074	17,755	1,505
1948 (total)	26,845	49,148	1,787	77,781	81,314	10,698
Passenger Car.	21,589	41,295	656	63,540	66,738	8,773
Truck and Bus	5,256	7,853	1,132	14,241	14,576	1,925
1949 (total)	31,584	43,466	1,467	76,517	76,369	10,638
Passenger Car.	28,129	36,440	509	65,077	65,140	8,904
Truck and Bus	3,456	7,026	958	11,440	11,228	1,734
1950 (total)	41,349	56,808	1,430	99,587	92,754	3,794
Passenger Car.	36,678	47,103	642	84,423	78,598	3,050
Truck and Bus	4,671	9,705	788	15,164	14,156	743
1951 (total)	32,153	44,612	1,677	78,442	83,405	8,765
Passenger Car.	26,729	34,226	723	61,678	65,546	6,973
Truck and Bus	5,424	10,386	954	16,764	17,859	1,791
1952:						
Aug. (total)	1,632	6,226	131	7,989	6,933	10,637
Passenger Car.	1,312	5,336	85	6,732	5,927	7,785
Truck and Bus	320	890	47	1,257	1,006	2,852
Sept. (total)	2,826	5,082	141	8,049	7,391	9,960
Passenger Car.	2,349	4,225	91	6,666	6,197	7,297
Truck and Bus	476	857	50	1,383	1,194	2,663
Oct. (total)	3,200	4,532	114	7,846	8,663	10,821
Passenger Car.	2,635	3,584	59	6,277	7,185	8,244
Truck and Bus	565	948	55	1,569	1,478	2,578

Source: The Rubber Manufacturers Association, Inc.

Cotton, Rayon and Nylon Tire Fabrics

(Production in Thousands of Pounds)

	Cotton: Tire Cord Not Woven	Cotton: Cord Fabric Woven	Cotton: Chafer and All Other Tire Fabrics	Cotton: Total	Rayon and Nylon[b]: Tire Cord Not Woven	Rayon and Nylon[b]: Tire Cord And Other Tire Fabrics	Rayon and Nylon[b]: Total
1948:							
Jan.-Mar.	18,546	50,251	19,391	88,188	a	60,569	60,569
Apr.-June	15,585	45,385	18,213	79,183	a	59,759	59,759
July-Sept.	29,743	45,927	c	75,670	a	63,642	63,642
Oct.-Dec.	13,321	34,424	15,879	63,624	a	65,258	65,258
Total	77,195	175,987	53,483	306,665	.....	249,228	249,228
1949:							
Jan.-Mar.	d	33,213	25,395	56,608	a	68,296	68,926
Apr.-June	5,309	29,114	13,617	48,040	a	68,269	68,269
July-Sept.	1,343	16,620	11,141	29,104	15,640	55,969	71,609
Oct.-Dec.	180	17,650	11,886	29,716	12,967	58,890	72,857
Total	6,832	96,597	62,039	163,468	28,607	251,424	281,661
1950:							
Jan.-Mar.	3,939	19,210	12,948	36,097	12,469	60,981	73,450
Apr.-June	11,077	29,498	14,071	54,646	11,510	59,966	71,476
July-Sept.	10,529	39,792	15,101	65,152	13,161	61,614	74,775
Oct.-Dec.	13,314	37,759	14,405	65,578	12,942	63,399	76,341
Total	38,859	126,259	56,525	221,473	50,082	245,960	296,476
1951:							
Jan.-Mar.	11,497	38,269	16,737	66,503	11,878	65,512	77,390
Apr.-June	12,608	42,491	17,055	72,154	11,979	61,957	73,936
July-Sept.	16,744	44,340	17,433	78,517	12,091	67,982	80,073
Oct.-Dec.	14,237	43,820	13,899	71,956	a	83,354	83,354
Total	55,116	168,920	65,124	289,160	35,948	278,805	314,753

Source: U. S. Bureau of the Census.

Notes: (a) Included with tire cord and fabrics to avoid disclosures of operations of individual mills. (b) Fuel cell fabrics are not included with rayon and nylon tire cord and fabrics. (c) Included with tire cord not woven. (d) Included with chafer and all other tire fabrics.

Automotive Inner Tubes

(Thousands of Units)

	Shipments: Original Equipment	Shipments: Replacement	Shipments: Export	Shipments: Total	Production	Inventory End of Period
1940	22,172	29,070	972	52,214	52,237	7,017
1941	24,722	33,749	1,232	59,703	57,433	4,686
1942	6,895	7,213	159	14,267	12,685	6,206
1943	6,350	12,474	189	19,014	15,014	2,626
1944	6,460	20,569	196	27,224	27,488	2,813
1945	5,988	33,906	411	40,304	41,742	3,627
1946	15,327	59,357	1,424	76,108	77,251	3,820
1947	25,046	46,560	2,483	74,088	79,181	8,059
1948	26,833	40,548	1,119	68,499	70,033	9,641
1949	31,521	31,450	887	63,858	65,114	10,657
1950	41,240	42,671	811	84,723	80,179	....
1951	32,151	32,284	1,071	65,507	67,249	10,094
1952:						
July	1,185	3,228	94	4,507	4,790	11,223
Aug.	1,638	3,706	86	5,431	4,867	10,627
Sept.	2,820	3,067	98	5,984	5,397	10,086
Oct.	3,198	2,602	59	5,859	6,220	10,386

Source: The Rubber Manufacturers Association, Inc.

Smoked Sheets—Spot Closing Prices

(New York Market—Cents per Pound)

Year	High	Low	Avg.	Year	High	Low	Avg.
1911	184	114	141.30	1932	4¾	2½	3.49
1912	140	108	121.60	1933	9⅞	2⅞	5.96
1913	113	59	82.04	1934	15⅞	8¾	12.92
1914	93	56	65.33	1935	13¾	10½	12.37
1915	79	58½	65.85	1936	23	13½	16.41
1916	102	55	72.50	1937	26⅛	14	19.39
1917	90	52	72.23	1938	17⅞	10¼	14.64
1918	70	40	60.15	1939	24	14⅛	17.57
1919	57	38½	48.70	1940	24	18¼	20.10
1920	56½	16	36.30	1941	24⅞	19¼	22.40
1921	21¾	11½	16.36	1942	22½	22½	22.50
1922	28¾	13⅜	17.50	1943	22½	22½	22.50
1923	37½	24¾	29.45	1944	22½	22½	22.50
1924	40¾	17⅜	26.20	1945	22½	22½	22.50
1925	121	34⅜	72.46	1946	22¾	22¼	22.50
1926	88½	36¾	48.50	1947	25	14	20.00
1927	41¾	33	37.72	1948	25	18	21.99
1928	41¼	17	22.48	1949	19¼	15⅞	17.57
1929	26⅞	15½	20.55	1950	86	18	41.10
1930	16¼	7½	11.98	1951	76	52	(a)
1931	8⅝	4¼	6.17	1952*	33	26½	29.13

Note: Price was fixed by Government on August 6, 1941, at 22½c a pound for non-war uses. Free trading was resumed May 1, 1947. (a) Free trading suspended March 31, 1951. GSA selling price ranged between 52 and 66c during balance of year. * Free trading was resumed on July 1, 1952; figures represent only July through December, 1952.

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market—in Cents)

Average Monthly Price Per Pound

	1945	1946	1947	1948	1949	1950	1951	1952
Jan.	22.36	25.49	32.58	36.09	33.37	31.89	45.04	42.96
Feb.	22.29	26.57	33.91	33.63	33.41	32.79	(a)	41.64
Mar.	22.43	27.52	35.89	35.04	33.44	32.65	46.06	41.70
Apr.	21.88	28.40	35.89	38.10	33.84	33.23	46.06	41.79
May	23.30	28.17	36.51	38.57	33.73	33.64	46.06	39.68
June	23.42	29.89	37.83	38.12	33.56	34.61	46.06	41.31
July	23.27	34.11	38.03	34.89	32.99	38.11	41.21	40.37
Aug.	23.10	36.31	34.83	32.23	32.06	38.93	35.93	40.42
Sept.	23.25	37.59	32.21	31.92	30.94	41.62	36.20	39.75
Oct.	23.85	36.79	32.39	32.01	30.32	40.66	38.13	37.52
Nov.	24.71	31.50	34.50	32.15	30.52	43.11	42.76	35.59
Dec.	25.21	33.03	36.74	32.90	31.08	43.37	43.32	33.76
Average for Year	23.25	31.28	35.11	34.64	32.44	37.05	42.43	39.71

Note: The Government established a ceiling price of 45.76c for spot cotton on March 3, 1951. (a) Trading suspended during February.

Consumption of Vinyl Resins

(In Thousands of Pounds)

	Sheeting and Film[a]	Textile and Paper Coating Resins	Molding and Extrusion Materials	All Other
1948	98,021	31,085	73,598	21,147
1949	157,544	29,470	81,842	19,792
1950	227,149	46,044	113,889	21,868
1951	161,547	43,688	134,890	23,934
1952:				
June	10,015	3,303	8,739	2,174
July	10,504	2,980	8,298	2,295
Aug.	13,282	3,903	11,466	3,054
Sept.	13,939	3,714	12,663	3,267

Source: U. S. Tariff Commission.

Note: (a) Includes weight of fillers, plasticizers, extenders and safety glass sheeting. Beginning January, 1951, statistics are listed on a resin content basis.

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Rubber Industry Employment, Wages and Hours

All Rubber Products

	1951				1952			
Mo.	Production Workers (thousands)	Average Weekly Earnings	Average Weekly Hours	Average Hourly Earnings	Production Workers (thousands)	Average Weekly Earnings	Average Weekly Hours	Average Hourly Earnings
Jan.	222	$66.78	40.4	$1.653	218	$74.19	40.9	$1.814
Feb.	222	63.37	38.9	1.629	215	73.31	40.5	1.810
Mar.	220	65.88	40.0	1.647	215	72.58	40.3	1.801
Apr.	219	65.96	40.0	1.649	213	71.40	39.6	1.803
May	220	68.56	41.3	1.660	213	73.47	40.5	1.814
June	220	71.27	41.9	1.701	215	75.01	40.9	1.834
July	217	70.81	41.0	1.727	202	73.42	40.1	1.831
Aug.	218	69.52	40.7	1.708	212	74.93	41.1	1.823
Sept.	218	70.18	40.9	1.716	217	....	....	....
Oct.	215	68.67	40.3	1.704	....	....	....	....
Nov.	219	69.46	40.5	1.715	....	....	....	....
Dec.	219	73.91	41.2	1.794	....	....	....	....

Tires and Tubes

Jan.	91.3	73.69	38.4	1.919	94.4	86.99	40.9	2.127
Feb.	90.6	66.95	35.5	1.886	94.2	85.75	40.6	2.112
Mar.	88.3	71.40	37.6	1.899	93.9	83.46	39.8	2.097
Apr.	87.4	70.15	37.0	1.896	94.6	81.90	39.3	2.084
May	88.3	75.92	39.4	1.927	94.6	84.96	40.4	2.103
June	89.9	82.44	41.7	1.977	95.3	87.79	41.1	2.136
July	90.0	83.67	41.4	2.021	92.9	86.67	40.5	2.140
Aug.	91.5	82.07	41.2	1.992	92.4	87.17	41.0	2.126
Sept.	92.4	81.64	40.9	1.996	....	....	....	....
Oct.	89.8	78.76	39.9	1.974	....	....	....	....
Nov.	94.8	80.27	40.5	1.982	....	....	....	....
Dec.	95.4	86.26	41.0	2.104	....	....	....	....

Rubber Footwear

Jan.	24.9	57.53	41.6	1.383	25.4	60.27	40.1	1.503
Feb.	25.3	55.87	40.6	1.376	24.7	60.46	39.8	1.519
Mar.	25.0	58.17	41.4	1.405	24.2	61.51	40.2	1.530
Apr.	24.8	59.82	42.1	1.421	22.0	59.42	39.3	1.512
May	25.4	61.48	42.9	1.433	23.5	60.69	39.9	1.521
June	25.7	59.98	42.3	1.418	23.7	61.38	40.3	1.523
July	24.8	54.68	39.0	1.402	18.6	58.34	39.1	1.492
Aug.	25.2	57.04	40.8	1.398	23.5	61.73	40.4	1.528
Sept.	25.3	55.94	40.1	1.395	....	....	....	....
Oct.	25.5	56.76	40.0	1.404	....	....	....	....
Nov.	25.6	56.64	40.2	1.409	....	....	....	....
Dec.	25.5	59.95	40.7	1.473	....	....	....	....

All Other Rubber Products

Jan.	105.8	63.06	41.9	1.505	97.9	65.63	41.2	1.593
Feb.	106.3	61.95	41.3	1.500	96.3	64.43	40.6	1.587
Mar.	106.3	63.13	41.7	1.514	97.2	64.83	40.8	1.589
Apr.	106.3	63.81	41.9	1.523	96.3	63.68	39.9	1.596
May	106.0	64.09	42.5	1.508	95.0	65.32	40.8	1.601
June	104.7	64.47	42.0	1.535	95.7	65.73	40.9	1.607
July	102.2	63.29	41.1	1.540	89.0	62.96	40.0	1.574
Aug.	101.2	61.42	40.3	1.524	94.7	66.12	41.3	1.601
Sept.	100.2	63.06	41.0	1.538	....	....	....	....
Oct.	99.4	62.68	40.7	1.540	....	....	....	....
Nov.	98.2	62.36	40.6	1.536	....	....	....	....
Dec.	97.9	65.45	41.5	1.577	....	....	....	....

Source: U. S. Department of Commerce and Labor.

Note: Data are based upon reports from cooperating establishments covering both full and part-time employees who worked during or received pay for the pay period ending nearest the 15th of the month. The employment series have been adjusted to levels indicated by Federal Security Agency data for 1947, and have been carried forward from 1947 bench-mark levels, thereby providing consistent series. Hours and earning data pertain only to production and related workers.

Production Index for the Rubber Industry

Production 1935-1939 = 100

(Based on man-hours)

	1950	1951	1952		1950	1951	1952
Jan.	194	244	248	July	222	243	225
Feb.	195	235	243	Aug.	236	243	242
Mar.	197	239	242	Sept.	244	245	249
Apr.	203	238	235	Oct.	250	239	246
May	213	247	242	Nov.	250	245	....
June	221	251	246	Dec.	251	250	....

Source: U. S. Department of Commerce.

Sales by the Rubber Industry

(In Millions of Dollars)

	1950	1951	1952		1950	1951	1952
Jan.	265	454	468	July	454	438	408
Feb.	273	434	442	Aug.	457	467	452
Mar.	293	459	406	Sept.	404	435	482
Apr.	288	439	437	Oct.	405	445	....
May	321	432	424	Nov.	397	438	....
June	350	433	430	Dec.	424	363	....

Source: U. S. Department of Commerce.

Rubber Manufacturers' Inventories

(Based upon Book-Value)

(In Millions of Dollars)

	1950	1951	1952		1950	1951	1952
Jan.	524	562	840	July	501	616	884
Feb.	526	555	848	Aug.	483	640	884
Mar.	532	554	865	Sept.	502	659	877
Apr.	536	565	877	Oct.	524	705	....
May	540	583	878	Nov.	564	739	....
June	544	610	864	Dec.	549	799	....

Source: U. S. Department of Commerce.

Various Compounding Materials Consumed by the Rubber Industry

Material	1945	1946	1947	1948	1949	1950	1951
Antimony, Primary:							
Short tons	.....	.....	39	41	55	103 [c]	19 [c]
% of total	.....	.....	.002	.003	.005	.007	.001
Asphalt: [a]							
Short tons	19,483	28,715	32,113	19,967	18,050	26,819	21,414
% of total	.005	.007	.007	.004	.003	.003	.003
Barite (Barytes):							
Short tons	10,000	20,000	17,000	18,000	14,000	19,000	15,000
% of total	2.1	4.4	3.1	2.85	2.53	3.31	2.13
Carbon Black:							
Short tons	402,193	470,732	471,790	435,282	383,565	515,184	530,614
% of total	95.5	95.3	94.3	95.5	93.3	92.9	92.9
Clay, Kaolin:							
Short tons	109,936	162,393	166,201	176,965	197,341	263,306	231,331
% of total	11.7	12.3	11.5	11.3	13.1	15.0	12.7
Clay, Fire & Stoneware:							
Short tons	7,800	12,951	17,970	15,480	27,148	9,500	.....
% of total	0.1	0.2	0.2	0.2	0.3	0.1	.....
Lime:							
Short tons	7,170	3,193	589	1,154	715	908	.....
% of total	0.12	0.05	0.01	0.02	.0002	.0002	.....
Litharge:							
Short tons	1,864	2,131	2,205	2,835	1,398	3,047	2,641
% of total	1.3	1.6	1.3	1.8	1.2	1.7	1.7
Lithopone:							
Short tons	977	1,607	3,085	4,192	3,245	4,092	3,295
% of total	0.7	1.1	1.9	3.0	4.1	3.9	3.2
Mica, Ground:							
Short tons	3,715	4,951	3,900	4,372	3,856	5,776	6,551
% of total	7.1	8.0	6.0	7.0	7.0	8.0	9.0
Sulfur:							
Short tons	64,960	72,800	72,800	70,560	59,360	.....	.....
% of total	2.0	2.2	1.8	1.7	1.5	.....	.....
Talc: [b]							
Short tons	63,758*	65,980	71,840	66,226	53,400	75,900	70,970
% of total	16.0	14.4	13.9	13.0	12.0	12.0	11.2
Zinc Oxide:							
Short tons	63,447	83,776	82,248	82,895	58,496	82,944	71,507
% of total	49.6	53.1	51.2	54.9	52.5	51.6	48.5

Source: U. S. Bureau of Mines.

Notes: [a] Solid and semi-solid products of less than 200 penetration. [b] Includes prophyllite and ground soapstone. [c] Does not include precipitated antimony sulfide as in previous years. * Revised.

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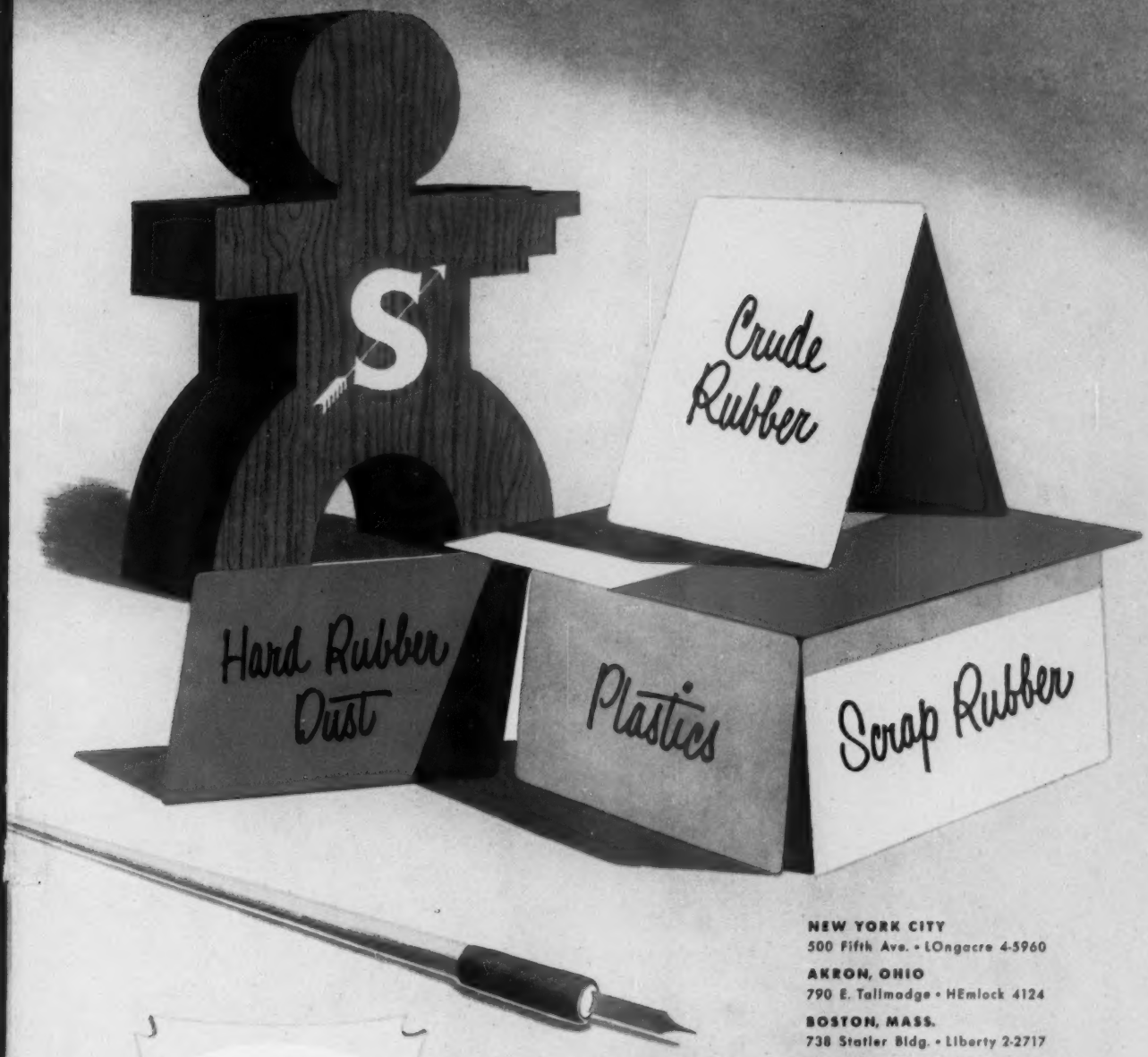

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